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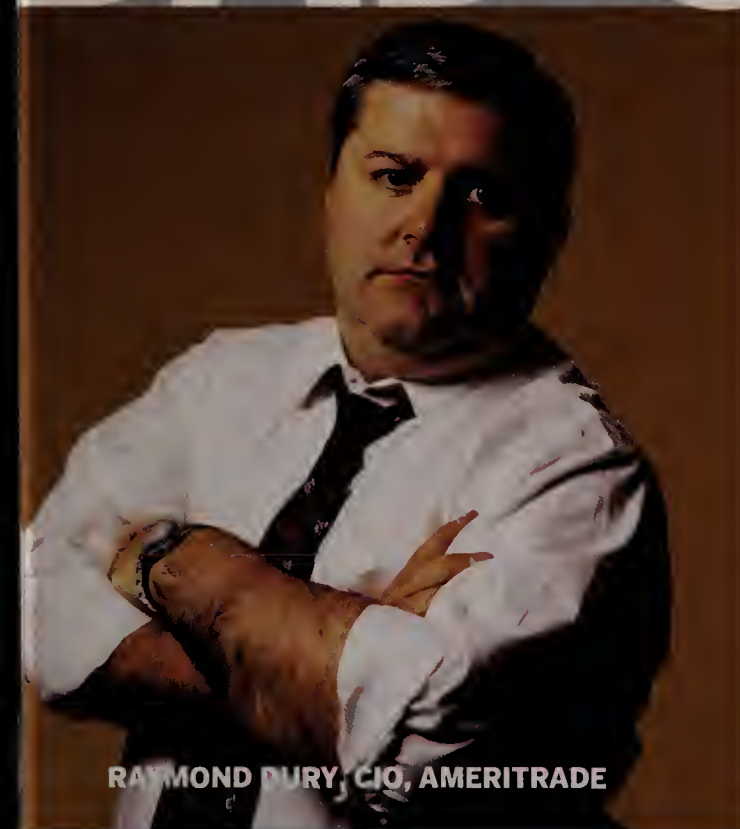
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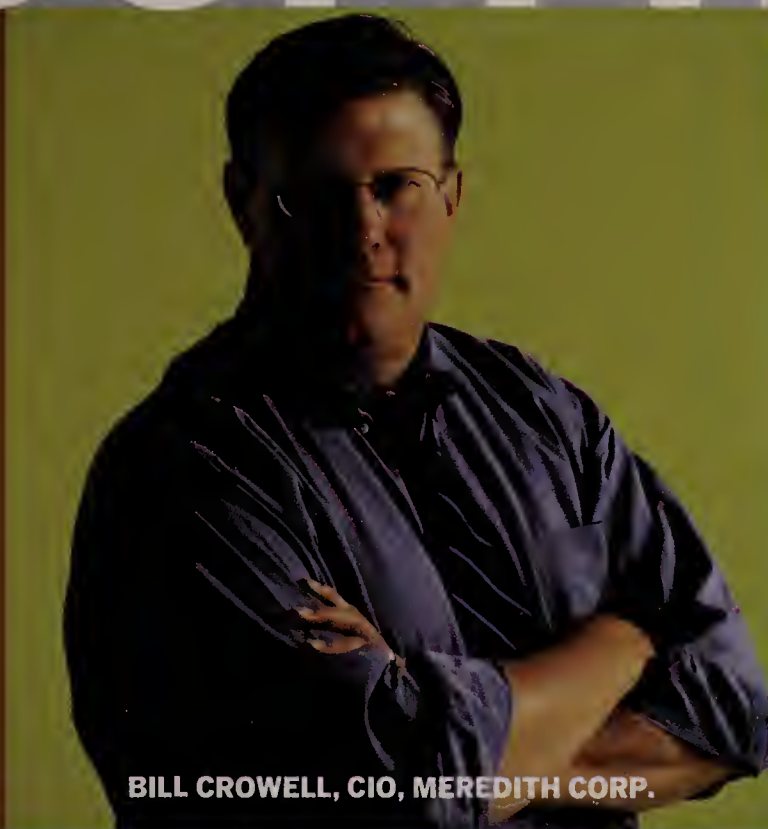
Got Wireless Apps? Get Ready
to Throw Them Out. *Page 105*

Collaborative Manufacturing
Why It's Just Not Happening Yet *Page 94*

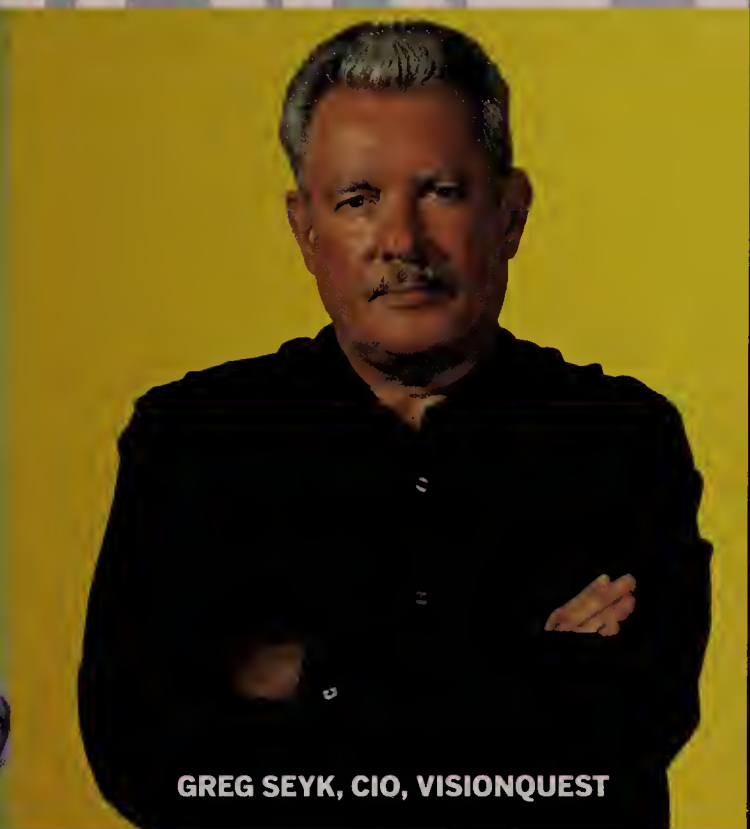
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GREG SEYK, CIO, VISIONQUEST

They're Mad as Hell, and They're Not Going to Take It Anymore!

CIOs Are Pushing for Software Industry Reform and Finding New Options
Here's How You Can Too. *Page 78*



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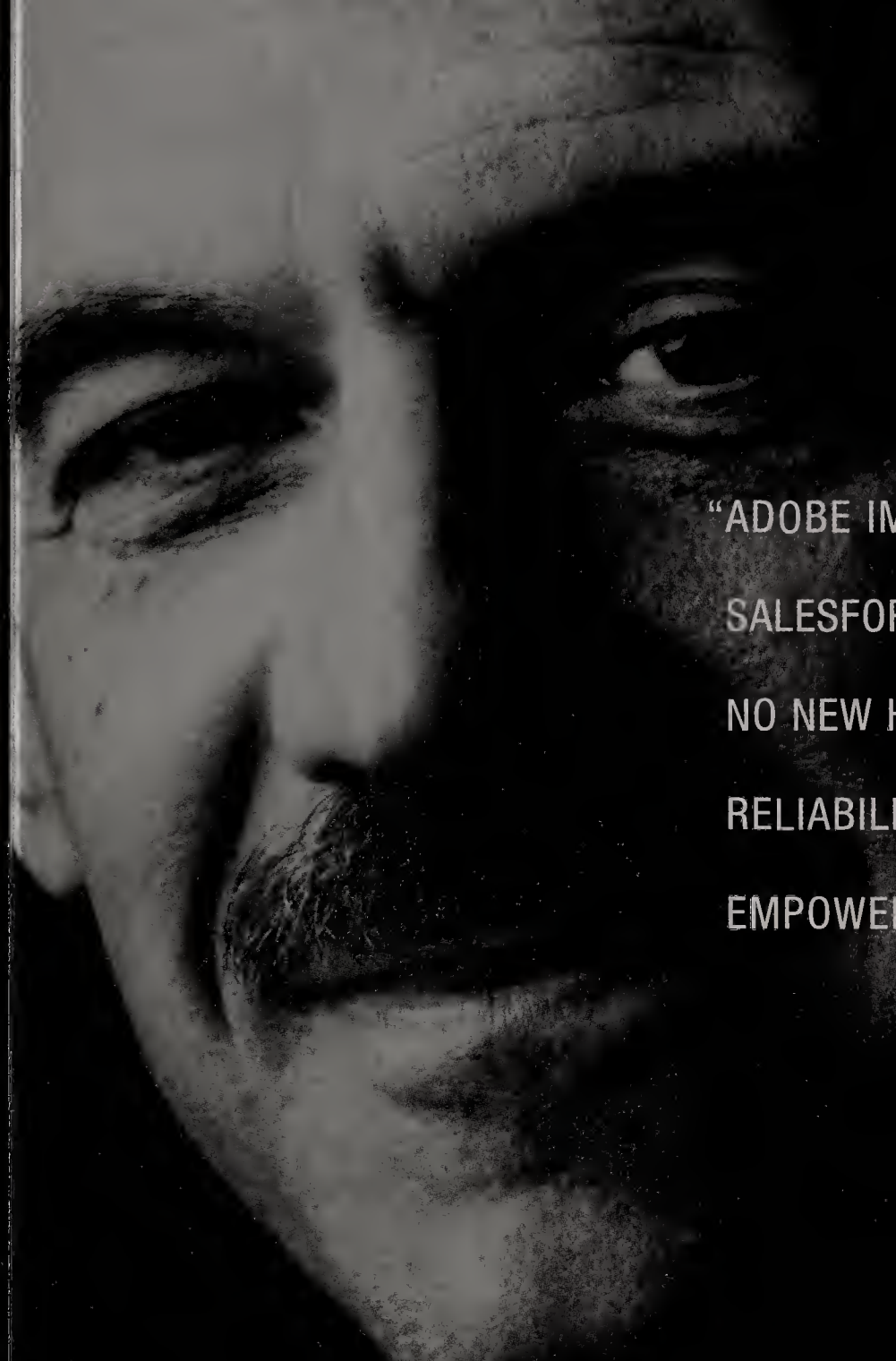
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Cover Story

SOFTWARE DEVELOPMENT | 78



Raymond Dury, co-CIO,
Ameritrade



Bill Crowell, CIO,
Meredith Corp.



Greg Seyk, CIO,
VisionQuest

Let's Stop Wasting \$78 Billion a Year

Analysts estimate that American businesses end up spending billions for software that doesn't do what it's supposed to. Some CIOs are tired of playing the sap and are beginning to take action. *By Meridith Levinson*

COVER PHOTO LEFT TO RIGHT BY: MARK VAN S., DOUG HETHERINGTON, REED RAHN

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E-MAIL MANAGEMENT

How to Tame the E-Mail Beast | 84

E-mail management is principally a people issue, not a technical one. Read tips from CIOs on how to get the message out to your employees. *By Lauren Gibbons Paul*

COLLABORATIVE COMPUTING

Nobody to Play With | 94

The VP of IT at the Goldman Industrial Group of Vermont thought his suppliers would jump at the chance to collaborate electronically. Two years and millions of dollars later, he's still waiting for a partner. *By Ben Worthen*



"IT'S A MAGICAL TIME
IN THE HISTORY OF SCIENCE
NOW THAT WE HAVE SO
MUCH COMPUTING POWER
AND STORAGE CAPACITY."

—Robert Dinerstein,
senior research scientist,
Aventis Pharma 114

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You Go First | 100

Tread carefully: Being the first CIO a company has ever had can be perilous—or it can be a career-defining opportunity. *By Eric Berkman*

WIRELESS TECHNOLOGY

Will You Still Love It Tomorrow? | 108

Getting a wireless program to work today is no problem. Living with it tomorrow is another matter. Here's how to do it. *By Ben Worthen*

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The marriage of IT and medical research may be just what traditional pharmaceutical companies need to survive in an increasingly competitive field. *By Stephanie Overby*

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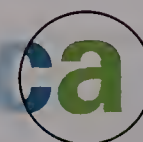
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PEER TO PEER

Birds of a Feather | 46

Local CIO gatherings provide a unique way to join forces with your peers.

By John A. Zarb

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The Confidence Game | 52

To reap outsourcing's greatest rewards, both client and vendor must trust each other. By Eric K. Clemons and

Elizabeth T. Gray Jr.

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The telegram doesn't have the status it once had, but its legacy lives on.

By Sarah D. Scalet

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What's Wrong with Being First?

Most of the time, nothing. But being the first CIO a company has ever had does contain some inherent risks—and some attainable rewards. In "You Go First" (Page 100), we look at CIOs such as Ray Causey (right) who have boldly gone where no others have gone before them.

Mail Boxes Etc.'s first CIO Ray Causey had to deal with initial fears and distrust among the staffers he inherited. His position at Mail Boxes Etc. has since been eliminated.



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Web services are inevitable. Just ask the big guys. By Eric Knorr

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When it comes to Windows, you'd better buy now or you'll pay later.

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"There is a need to rebuild infrastructure, to upgrade information systems and to upgrade procedures to integrate modern technology. Every FBI manager and every agent needs to be computer literate."

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From the Editor

lundberg@cio.com

CIOs Unite!

THESE DAYS, with the economy faltering and so many things uncertain, technology investments are being scrutinized to a degree never seen before. CEOs and CFOs are demanding real value—delivered upon payment—for their IT investments. They're sick and tired of paying up front for just the promise of functionality. I know of at least three separate efforts to collectively influence the practices of large vendors or to find a way to live without commercial software providers at all. Some of these are public. Others are well-financed private research projects. I'm sure there are more perking around the country.

As soon as a few large, high-profile companies figure out how to run their businesses without the help of one of the 800-pound gorillas, others will follow suit. There's a lot of frustration, anger and resentment out there. Unfortunately, some of the largest, most successful software companies seem blind to the real feelings of their customers. But as successful as they may be today, they'll need to seriously reexamine their business models if they want to still be in the game when this shift comes.

CIOs, for their part, need to take advantage of this window of opportunity to leverage their buying power. They should work together to send a clear message to the industry about what they

will and won't pay for.

There is still much work to be done to realize the full benefits of what IT has to offer. Translation for vendors: There's still a whole lot of money to be made. The best way to get there is for CIOs and vendors to work together to develop products that solve real problems and work consistently and reliably.

Senior Writer Meridith Levinson explains how we got into the current predicament and how we might get out in our cover story, "Let's Stop Wasting \$78 Billion a Year," on Page 78. And in "A Letter to Our Suppliers," on Page 136, our CIO Confidential author issues a plea to vendors to market their products in a more realistic light—and why it's to their advantage to do so. I hope you like these articles. Please let me know what *you* think will improve the quality of packaged software and the practices of the software industry.

Albi Lundberg

In light of the terrible events of Sept. 11, we are reexamining our coverage plans for the upcoming months. Given our long lead time, this won't be reflected in print until our next issue, but please visit www.cio.com/online/crisis.html for ongoing coverage. We also want to know how things have changed for you in your business, given all that's happened; please write to me at lundberg@cio.com.

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Reader Feedback

CISCO IN-DEPTH

We like to think that the Internet-driven world is some different type of beast. But alas, Cisco's stumble was caused by a sin well documented throughout the thousands of years of human history. The executives believed their own propaganda. The genuine, sincere belief of indomitability that inevitably arises in a high-profile, high-growth company with a track record of groundbreaking success is predictable. Athens, GE, IBM, Rome, Sabre (which, by the way, is one of the former employers of Cisco's new CIO)...the list is long. All went through a phase of believing that they were indeed the best in the world. They fell in love with their processes and their awards, they failed to reexamine their beliefs, and they ultimately paid the financial price. A mature, truly skilled and savvy management team would have proactively managed the culture to avoid these stumbles.

Technology at fault? Give me a break. Since when do machines and software think? It's relatively easy to make money in a growth market with a decent product. Managing effectively over time is the real blue-ribbon test of the giants.

Kieran Major • Senior Consultant • MBC • Tulsa, Okla. • kmajor@webzone.net

It is interesting to note how dependent Cisco is on its automated systems. I am surprised to see that Cisco doesn't have a risk management division to handle risks related to downturns in the economy. I guess they didn't face this type of downturn before.

Day Veerlapati
President and CEO
S2Tech
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Investors are still asking why CIO didn't write this article a year ago.

[Xilinx CFO Kris] Chellam argues about macroeconomics considerations. Again, where was this guy before the "Cisco in denial" phase? Hindsight is always 20/20. If everybody is going to

dump on Cisco, let them ask how they would have done it differently?

We should all remember that John Chambers had the guts to stand up three weeks after his rosy forecast and admit to the problem. Maybe if other companies (say like Xerox) did that, investors could react more positively.

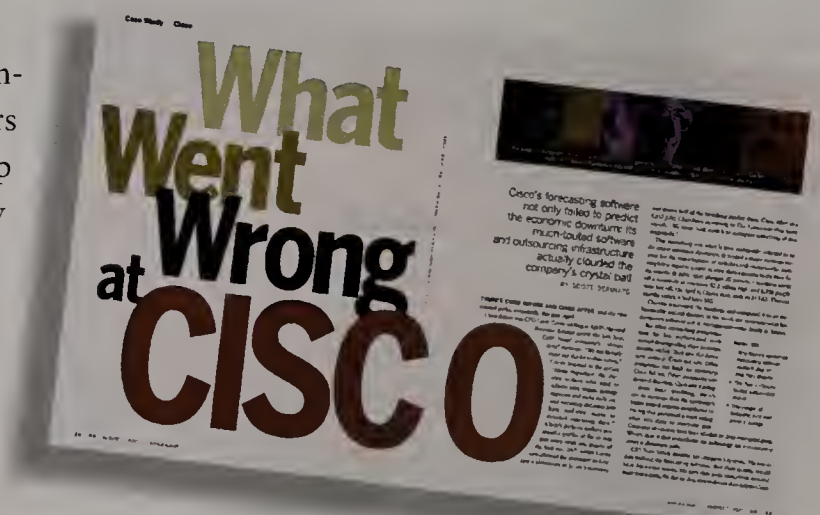
Dave Mahadevan
Executive Vice President
Stoner and Associates
Cincinnati
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Your article on Cisco is frank, even brutal. However, I disagree with one of your precepts. I have never seen a large company where internal managers have a better shot at raising tough issues than those in "outside" outsourcing companies, partners or consultants. You even gave an example of Cisco partners that

did not toe the Cisco rosy line. Ignoring, even hating, whistle-blowers is the common reaction to disloyal employees who do not fall in line with executive growth forecasts. The whole purpose of outsourcing is to create entities that have more of a vested interest in success or failure, and the focus and where-withal to back up the tough decisions.

If Cisco had not outsourced manufacturing it certainly would be in worse straits than it is now.

Your basic premise that those running the helm of Cisco did not grasp the ephemeral nature of forecasts—regardless of the sophistication of the forecasting technology—can be applied to any business. Having



been in the role of chief forecaster for one of the largest companies in the world, I remember that executives not only did not want to hear about downturns or negative scenarios, they couldn't hear them. What do we have to change to assist the hearing impaired?

Paul Tiffany
HelpTeam
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ptiffany@helpteam.net

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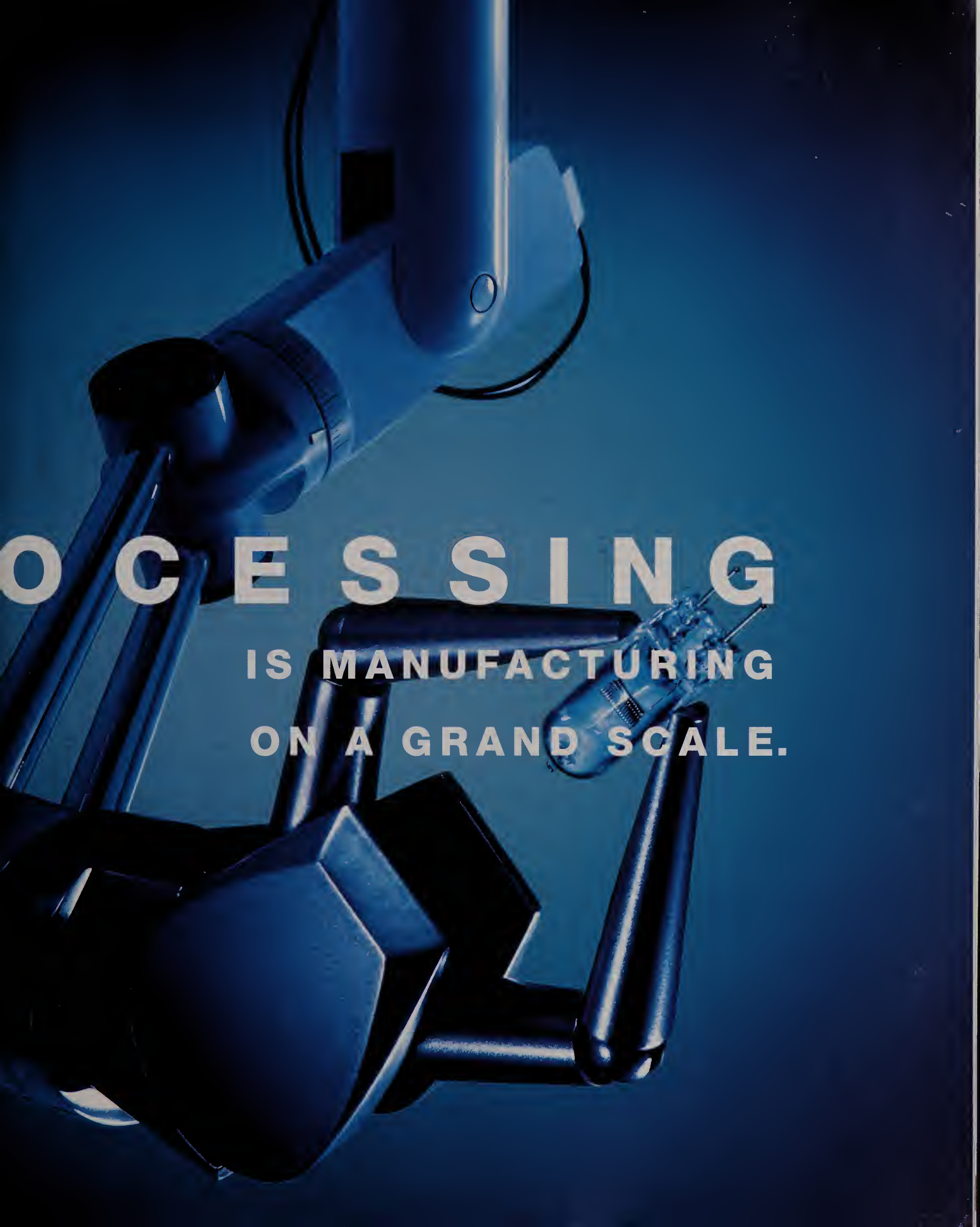
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A blue-tinted photograph of a robotic arm, likely from a semiconductor manufacturing plant. The arm is positioned diagonally across the frame, holding a small, intricate electronic component (possibly a microchip or probe) in its gripper. The background is a solid, deep blue, creating a high-tech, industrial atmosphere.

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FIVE BLATANT LIES

ABOUT APPLICATION SERVERS.

Let's start with a little unvarnished truth: We are here to advocate your acceptance of the Sybase Enterprise Application Server 4.0 (affectionately known as EAServer) as the singular de facto standard for your enterprise. This is, after all, our own advertisement.

That said, we promise to tell the truth. We won't distort any of the facts. We will, however, challenge some common misrepresentations and distortions.

"WE'RE MORE J2EE THAN THE OTHER GUYS."

We hear this one a lot. We assure you it is pure nonsense. It's akin to being a "little bit pregnant." You are or you aren't. The same is true with standards. It's either/or. Yes or no. Utterly binary.

For the record: Our EAServer is 100% compatible with J2EE. In fact, we were among the very first application servers to be so certified. We also support C and C++, COM, CORBA, and of course, our own PowerBuilder.

You simply won't find more comprehensive support for the leading technologies and applications most prevalent in e-Business today.

"AN APP SERVER IS ALL YOUR e-BUSINESS NEEDS."

Pure delusion. True, an app server can be thought of as the integration engine driving your e-Business.

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host of other components. And here's the crunch: the ability to integrate them. Anything less simply won't carry you into the future. Sybase provides all these components. Of course, EAServer runs as the integration engine unifying these components into your company's infrastructure.

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Any true 24x7 e-Business depends upon availability. And the most certain way to ensure availability is with clustering. Now, some say you can only effectively cluster in one place at a time.

Smart thinking until an unexpected power outage brings down your call center's data systems. Others say you can cluster, but only one operating system at a time. Which means you can never throw an NT box into a Unix cluster or vice versa. We beg to differ on both counts.

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Native C++ Support	●	●	●	●	●

trendlines

the **NEW** the **HOT** the **UNEXPECTED**

Edited by Sandy Kendall

DATA INTEGRATION

See the Ball

By Stewart L. Deck

AN INTENSELY focused man in pleated pants stands on the impossibly plush grass, peering first at his golf ball and then at the distant flag. The TV announcer murmurs, "He's 147 yards from the green and needs to hit it to the back left corner of the green—that's where the best scores on this hole have come from."

At home you're wondering, "How on earth does he know that?"

He knows it all thanks to a team of volunteers who walk along the course and use

lasers, handheld computers, IBM laptops, a wireless network and geographical information system technology to report real-time data on every shot by every player in every tournament of the Professional Golf Association (PGA) Tour.

The PGA Tour has been working on this new system—called ShotLink—for more than two years to enhance golf tournaments for television and Internet viewers. "ShotLink allows us to tell a better story about competition," says Steve Evans, vice president of information systems for the PGA Tour. "We have 250 more stats—including precise distance and accuracy and numbers on who the best putters are from 15, 20 or 30 feet."

Volunteer "walkers" at each hole use wireless Palm devices that have pull-down menus to relay to the central data hub specific information about each shot: the player's stance, the ball's lie and exactly when each ball was struck. Other walkers with laser pointers also relay data about where shots land, and this data is combined with data from the geographical information system to determine the exact location of each shot.



Stewart Cink keeps his eye on the ball during the May 2001 MasterCard Colonial in Fort Worth, Texas, where he finished 11 strokes behind winner Sergio Garcia.

Department of **BIG,** Scary Numbers

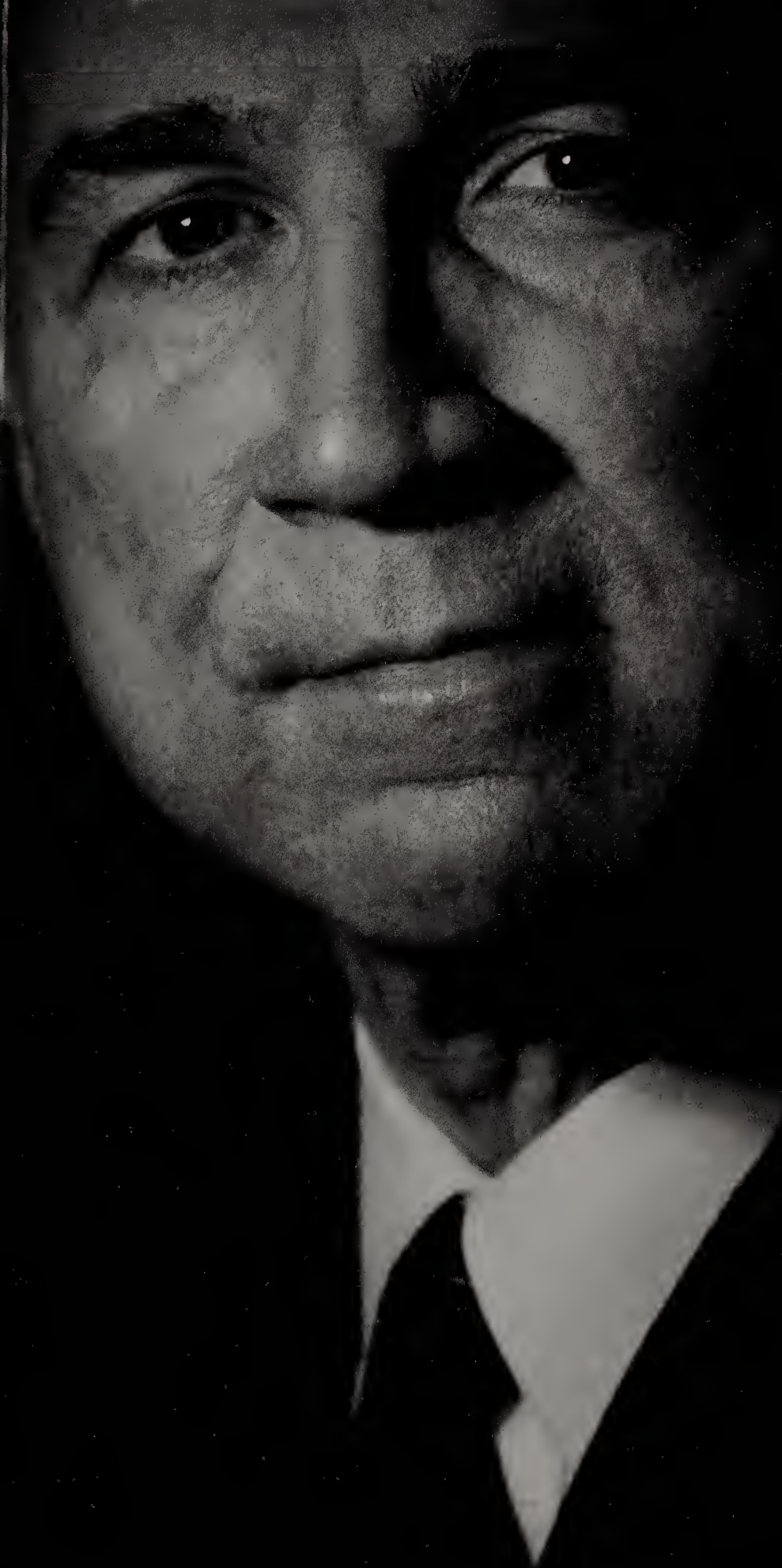
26 MILLION: predicted number of digital TV sets that will be shipped annually by 2005 **84 MILLION:** approximate number of broadband users expected by the end of 2005 **400 MILLION:** estimated number of interactive TV users by 2005

Sources: Cahners In-Stat, Butler Group

The PGA Tour planned to include club selection information for each shot, but that idea was temporarily shelved when caddies and players protested. Some secrets of the game are meant to stay that way.

RESPONSES OR IDEAS FOR TRENDLINES?
E-mail Departments Editor Sandy Kendall at skendall@cio.com.

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SUPPLY CHAIN MANAGEMENT

Cow Chips

THE BOTSWANA Ministry of Agriculture is installing the largest radio frequency ID system for cattle in the world. But the Gaborone-based government agency isn't taking the high-tech road simply to lead the world in livestock tracking. New European Union (EU) regulations aimed at identifying sources of disease require that exported packs of deboned beef be traceable from packing plants back to the individual animals the meat came from, with that information available in a centralized database. And the EU is Botswana's biggest export market for beef. Manual tagging isn't practical for the remote kraals and cattle posts in this African nation.

Two companies—AST Botswana in Gaborone and Inala Identification and Control in Midrand, South Africa—have contracted with the Ministry of Agriculture to design and implement the Livestock Identification Trace-back System (LITS), which will eventually monitor 4 million head of cattle. A pellet containing a transponder chip with a unique ID number is inserted into the animal's stomach. This makes it possible for a radio frequency reader to scan the ID number and relay it to a field computer. In addition to making Botswana compliant with EU regulations, the LITS system also makes it easier to locate lost or stolen cattle, improves the ability to manage disease outbreaks and lowers costs because the ID pellets can be recycled, according to ministry officials.

So far, the ministry has rolled out a database for the system and has begun to launch it in two districts. By July, 75,000 head of

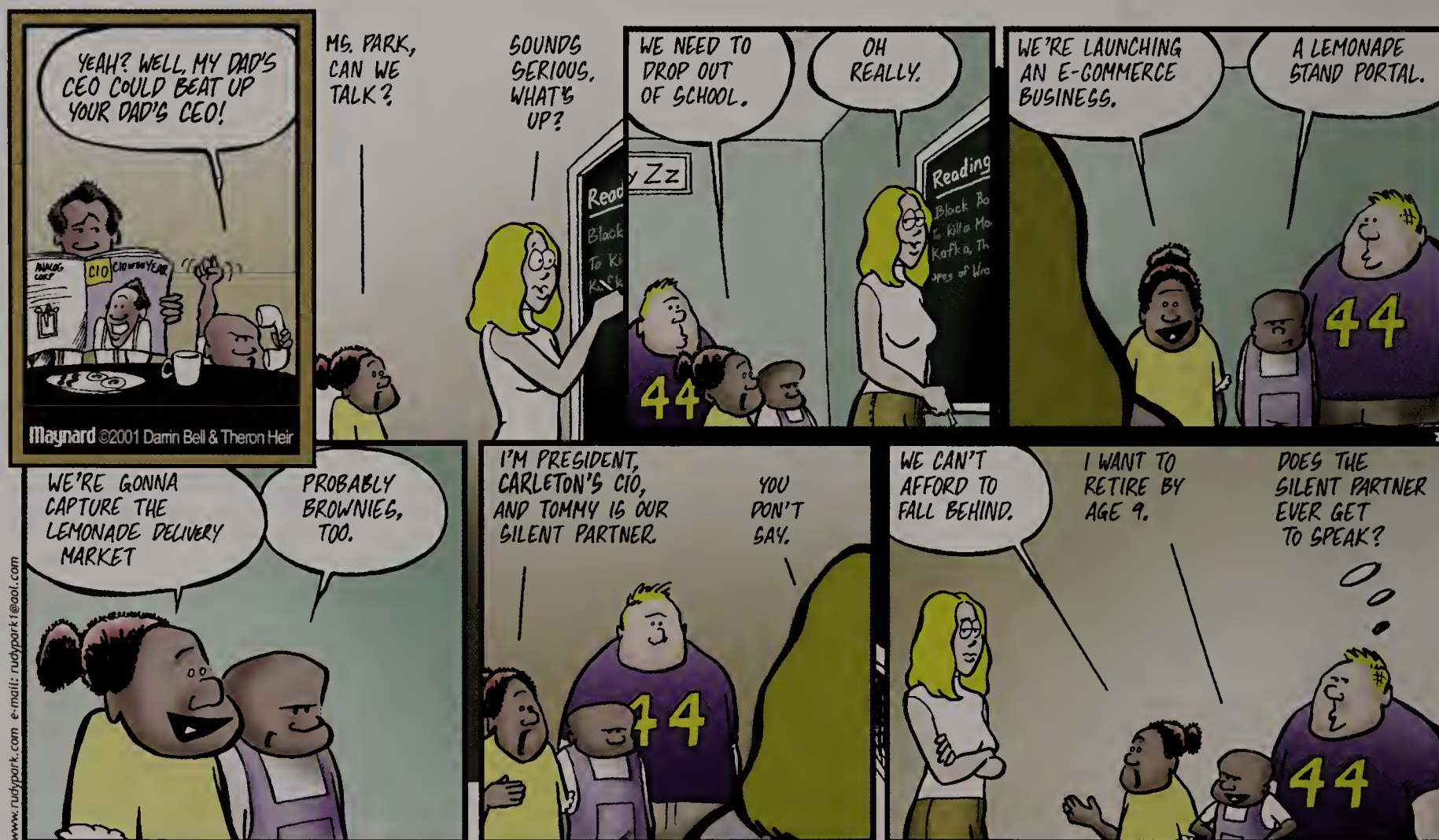
cattle in the Kweneg district and 60,000 in the Kgatleng district had been tagged. A nationwide rollout is expected in the next two years.

—Stephanie Overby



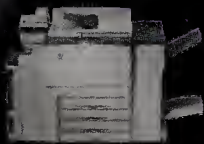
Maynard

BY DARRIN BELL AND THERON HEIR



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Washington Watch

Edited by Elana Varon

FBI: Cybercrime Still a Priority

IN THE AFTERMATH of the Sept. 11 terrorist attacks on the World Trade Center and the Pentagon, government officials say they will continue to pursue policies designed to protect against cyberattacks. At the FBI, Director **Robert Mueller** is expected to press forward with the anti-cybercrime plans he identified as a priority at his confirmation hearing in July.

"Just because we're working hard on the terrorism investigation doesn't mean we'll let our other top priorities be neglected," Spokeswoman Debbie Weierman said after the attacks.

But Mueller has his work cut out for him. The FBI has suffered high-profile embarrassments this year. A recent report by the General Accounting Office blamed inefficiency and understaffing at the FBI-staffed National Infrastructure Protection Center for poor performance in predicting



Robert Mueller

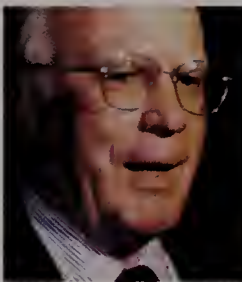
and issuing reports on cyberattacks. This past spring, after officials uncovered thousands of pages of undisclosed documents from the Oklahoma City bombing case, they admitted that the FBI's computer systems were hopelessly outdated.

Sen. Patrick Leahy (D-Vt.), chairman of the Senate Judiciary Committee, which oversees the FBI, notes that the bureau's PCs have not been updated for more than six years, and thousands are so old they can't run Windows-based software. Slow network connections and ancient databases that can't store photographs also hobble the agency, he says.

That antique equipment is a big prob-

lem, according to Mueller. "There is a need to rebuild infrastructure, to upgrade information systems and to upgrade procedures to integrate modern technology" into agency operations, he said at the July hearing. "Every FBI manager [and] every agent needs to be computer literate."

Mueller, a former U.S. attorney for Northern California, plans to throw FBI support behind cybercrime investigation units to foster cooperation between prosecutors and FBI agents. But for Mueller to succeed in his new role, he must recognize there's only so much the government can do, says **Jim Dempsey**, deputy director at The Center for Democracy & Technology, a nonpartisan policy organization. "The FBI can be very, very good at investigating crimes after they've been committed," Dempsey says. "They are never going to be trusted as a repository of cyberthreat information or the source of warnings and alerts." Instead, he thinks the private sector must be the first line of cyberdefense by making security a priority in systems design.



Sen. Patrick Leahy

—Simone Kaplan

How to Promote E-Commerce

SHOULD THE Bush administration do more to boost private sector use of IT? That's one question quietly raging in Washington policy circles. Prescriptions predictably vary according to ideology.

The government should actively promote IT to boost productivity, according to **Robert Atkinson**, vice president and director of the Technology & New Economy Project at the Progressive Policy Institute, a centrist Democratic think tank.

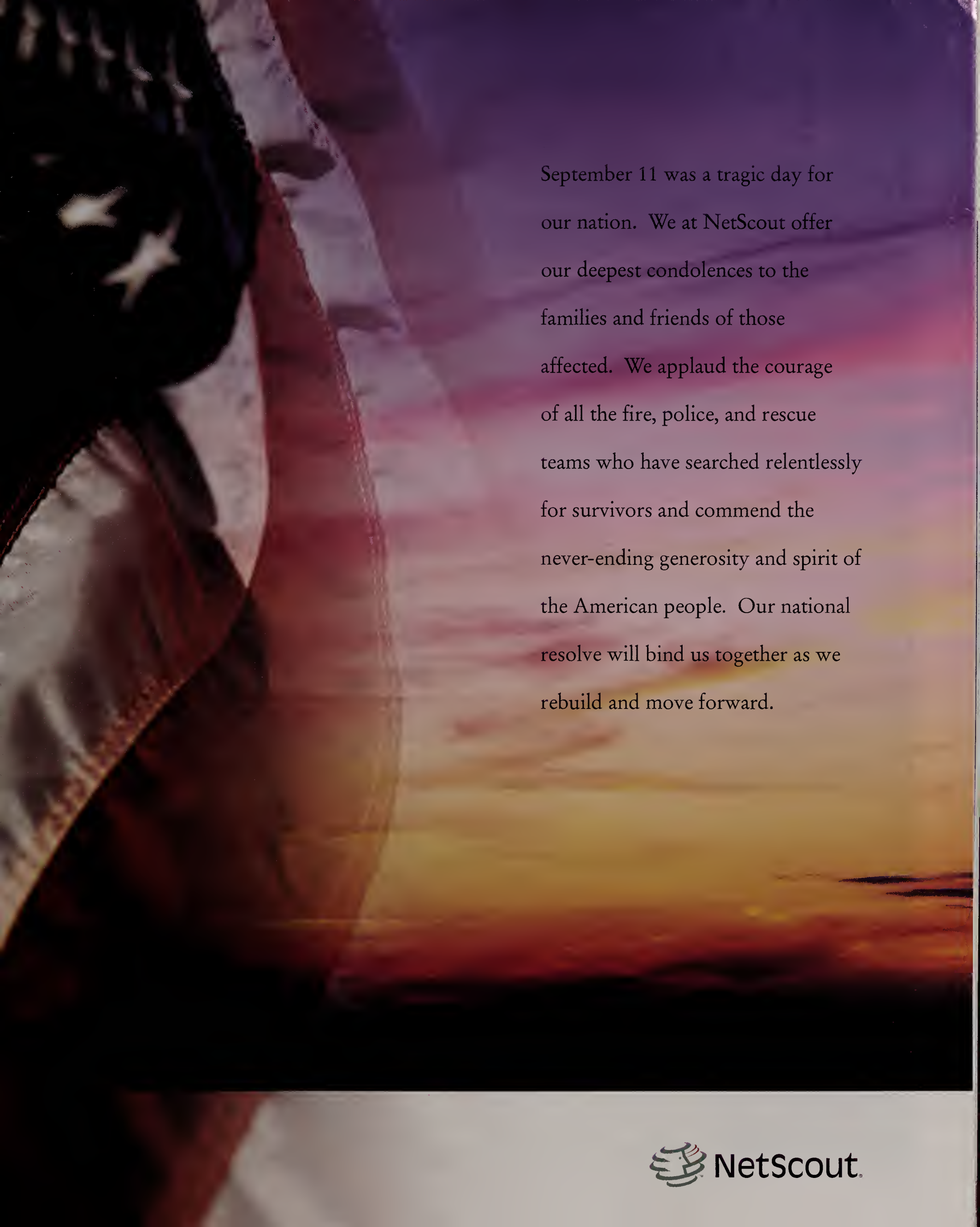
He doesn't suggest specific policies but says the feds should encourage increased adoption of IT in industries such as real estate, education and health care, where technologies like smart cards and wireless devices could increase efficiency and create usage models for other sectors. (So far, no legislation has been introduced to carry out this idea.)

Meanwhile, at The Progress and Freedom Foundation, a conservative technology policy think tank, Senior Fellow **Alan Charles Raul** says the government is already doing enough to promote e-commerce by enacting legislation such as last year's bill legalizing electronic records and signatures. "They need to promote e-commerce by removing barriers to online activities, not imposing onerous regulations," he says.

To date, Congress has maintained a hands-off approach toward regulation. It is unclear whether that will change with the Senate under Democratic control. By the time you read this, lawmakers may already have decided to extend a moratorium on Internet access taxes that expires later this month. But at press time, they were still waffling over whether they should come up with a scheme that would help states collect taxes from online purchases. —S.K.

"We cannot design some elaborate new privacy regime that will take into account every possible daydream of how information could be used."

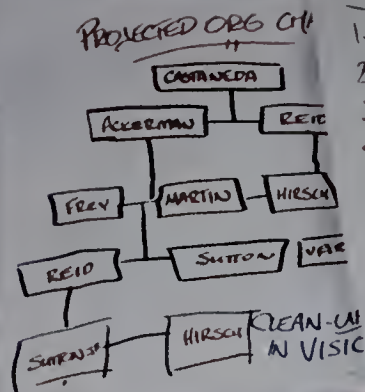
—Rep. Billy Tauzin (R-La.)

The background of the page is a composite image. On the left side, there is a close-up, slightly blurred view of the American flag, showing the stars and stripes. The right side of the page features a soft-focus image of a sunset or sunrise over a body of water, with warm orange and yellow light blending into a darker purple and blue sky.

September 11 was a tragic day for our nation. We at NetScout offer our deepest condolences to the families and friends of those affected. We applaud the courage of all the fire, police, and rescue teams who have searched relentlessly for survivors and commend the never-ending generosity and spirit of the American people. Our national resolve will bind us together as we rebuild and move forward.

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 CHEN - BLAZE UP - STE
 - ZINE - CONFLAGRATION - STE
 - DIGITAL PHOENIX - STE
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 (JER) - FIREZINE



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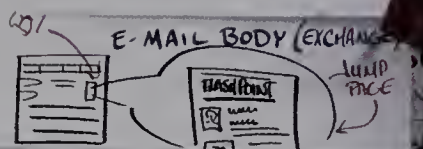
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07.09 ~~PROOFS~~ PROOFS INTERNAL
07.11 ~~COMMENTS~~ COMMENTS + PRINTER
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07.18 ~~FINAL~~ FINAL PROOF APPROVAL
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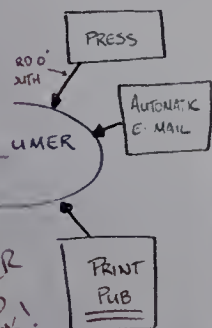
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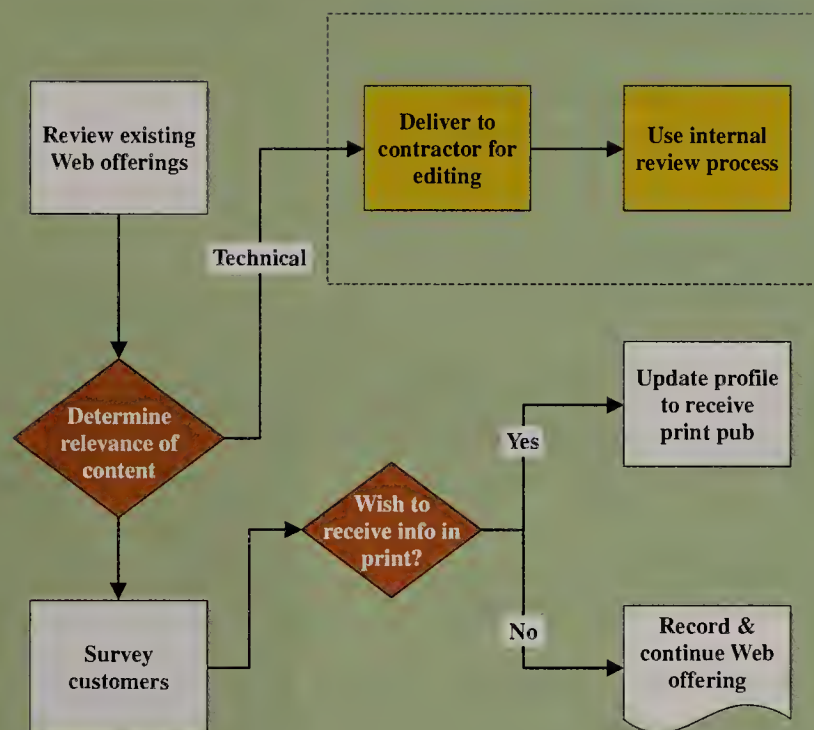


9:30 AM — coffee & Postscript
10:00 AM — CONVENT: ^{JD}
- introductions
→ Sarah
11:30 AM — Strategy Overview
→ Robin
→ Abby
12:00 PM — Methodology
→ Carol
1:30 PM — Results
→ Scott
2:00 PM — ACTION PLAN
→ Lorin
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SECURITY

Top 10 Headaches for Security Managers

If you're a security manager and want to reduce your stress levels, start by changing any of the following that exist in your organization.

1. Servers where ordinary users have log-in accounts.
2. Users who modify their own desktops, especially by installing their own software.
3. No mechanism for scanning the network for open ports.
4. A single server running everything.
5. No logging of firewalled traffic, no summaries or periodic traffic analysis, and no one looking at denied or rejected packets.
6. Lack of an intrusion detection system.
7. "Temporary" holes made in firewalls to accommodate specific requests.
8. Passwords kept on default settings with no password aging in force.
9. No subscription to a third-party bug-tracker, but employees are instead relying on the vendor to tell them of vulnerabilities found in their products.
10. An operations team that is not paranoid enough.

SOURCE: Sitaram Chamarty, Silverline Technologies



“The biggest trend recently was turning managers into investors. It's become almost a mania. Managers have every reason to be logical as public investors. They lose the ability to be irrational and objective because their compensation, their own interests, are directly aligned with financial returns. When markets are rat on a bull's head with irrational exuberance or insane delusions like we had recently, you're screwed.”

—Michael Schrage, author of *Serious Play* and codirector of the MIT Media Lab's eMarkets Initiative

E - M A I L

Irresistible Spam *By Sandy Kendall*

JUNK E-MAIL is a nuisance, but it's easy to spot, so just delete it. Right? Sure, we all know enough not to open messages titled “Make \$8,000 to \$30,000 a week from home” or “Better Sex!” But some spammers find ways to get around even the most hard-boiled e-mail-using skeptics.

Some subject heads are arresting not for their brazenness but for their subtlety. It's harder to bypass the ambiguous “Hello” than “Win a Free Motorola Pager Today!” One editor here recounts a message he received recently that combined two sly techniques: vagueness and the use of “Re:” making the message look like a response to something he'd sent. When he opened “Re: Payment,” it said, “How to meet hot young girls.”

“Not what I expected at all,” he says.

In a totally nonscientific poll, CIO writers and editors reported that the following subject heads are the hardest to resist—at least the first time.

“Hi!”
 “The information you requested”
 “Order Confirmation”
 “My new e-mail address” (from a sender named Sarah—who doesn't know a Sarah?)
 “Congratulations!”
 A blank subject line
 “Remember me?”
 “Sorry it took me so long”

Standouts for the most discreditable message titles (besides offers to enhance body parts the recipients didn't have) included:

“Investigate Anyone or Anything Now!”
 “Make Money While You SLEEP!”
 “I LOVE YOU AND I DON'T WANT YOU TO DIE!”
 “GET RID OF YOUR DEBT TODAY!”
 “Do you like Japanese Schoolgirls?”
 “Stop snoring today”
 “BE ORDAINED NOW!”

One editor offers a useful tip: Avoid all messages with exclamation points; however, he admits, “Last week I did open one that promised to ‘Take 10-20 years off your age!’ As it turned out, they were merely offering to make me *look* 10 to 20 years younger! What a fraud!”

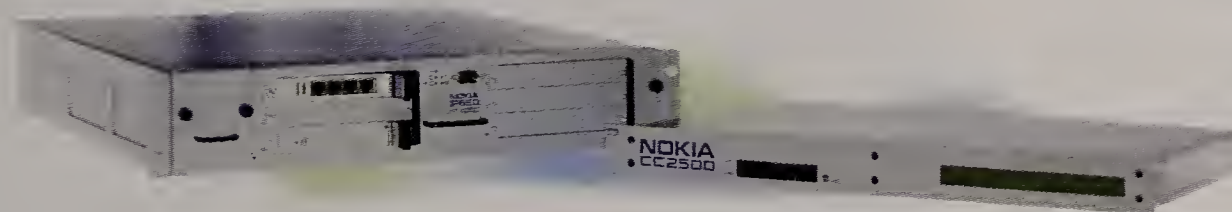
For more on e-mail management, see “How to Tame the E-Mail Beast,” Page 84.

"Nokia led the parade...in the firewall/VPN security appliance market."

—IDC, June 2001

"Closer to high-availability nirvana than any."

—Network World, December 11, 2000



"The Nokia IP530 is truly the best-of-breed platform in the firewall market."

—Information Security Magazine, September 2001

"A formula for earning our Editors' Choice."

—PC Magazine, September 25, 2001

"Easy to install and, more important, easy to restore."

—Network Computing, May 14, 2001



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Off the Shelf

Edited by Carol Zarrow

Take That!

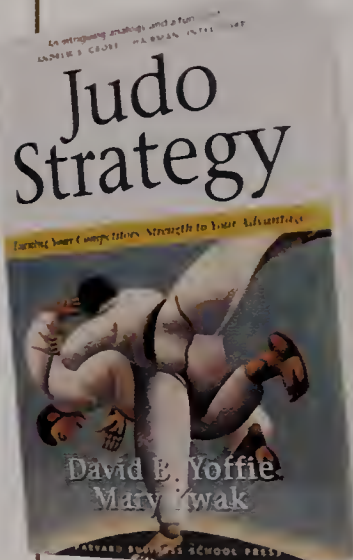
Judo Strategy: Turning Your Competitors' Strength to Your Advantage
By David B. Yoffie and Mary Kwak
Harvard Business School Press,
2001, \$29.95

WANNA THROW, pin and stranglehold your competition? The authors of *Judo Strategy* have some black-belt tips on overtaking your opponent. Yoffie and Kwak

liken the competition of business to that of judo and pull off this extended metaphor by providing several real-life examples. Netscape Communications is one. In its heyday, the company depended on speed and flexibility (as judoists do), not size, to compete with Microsoft.

But the company lost leverage when it moved so quickly into the Internet space that it lost control (a big judo don't). Some martial arts advice: Cooperate with competitors (think Amazon.com and Toys "R" Us), and don't copy your competitor's every move, just its compelling ones.

—Lauren Capotosto



cal. Meyerson, a professor of organizational behavior, studies the behavior of tempered radicals as they struggle to stay true to themselves and still fit in to modern corporate culture. Looking at individuals from three distinct corporate settings, she finds similarities in their actions and motivations. From the father who questions his company's rationale for Saturday business meetings, to the gay executive who brings his partner to a company social event, to the woman who tells her mentor that she will not follow his suggestion to change her hairstyle for a big presentation—each act, though seemingly small, is done in a conscious effort to maintain both personal and company values without compromising either.

In analyzing these different real-life scenarios, Meyerson demonstrates the wide range of influences such “everyday leaders” have on their environments, on others and on redefining the status quo while working within the system. She presents her research with a light hand, allowing the information to engage the reader as a comfortable narrative rather than a data sheet. She explains complex ideas and definitions easily and isn't ashamed to let herself be surprised by the results. Most compelling though are the personal writings of the radicals themselves, which describe thoughts and feelings that might not be so different from your own.

—Amanda S. Fox

CIO Best-Seller List

5.

Jack: Straight from the Gut
by Jack Welch
Warner Books, 2001

4.

First, Break All the Rules
by Marcus Buckingham
and Curt Coffman
Simon & Schuster, 1999

3.

Now, Discover Your Strengths
by Marcus Buckingham and
Donald O. Clifton
The Free Press, 2001

2.

Fish! A Remarkable Way to Boost Morale and Improve Results
by Stephen C. Lundin,
Harry Paul and John Christensen
Hyperion, 2000

1.

Who Moved My Cheese?
by Spencer Johnson
The Putnam Publishing Group, 1998

SOURCE: DATA FROM AUGUST 2001,
COMPILED BY AMAZON.COM, SEATTLE

Role Models

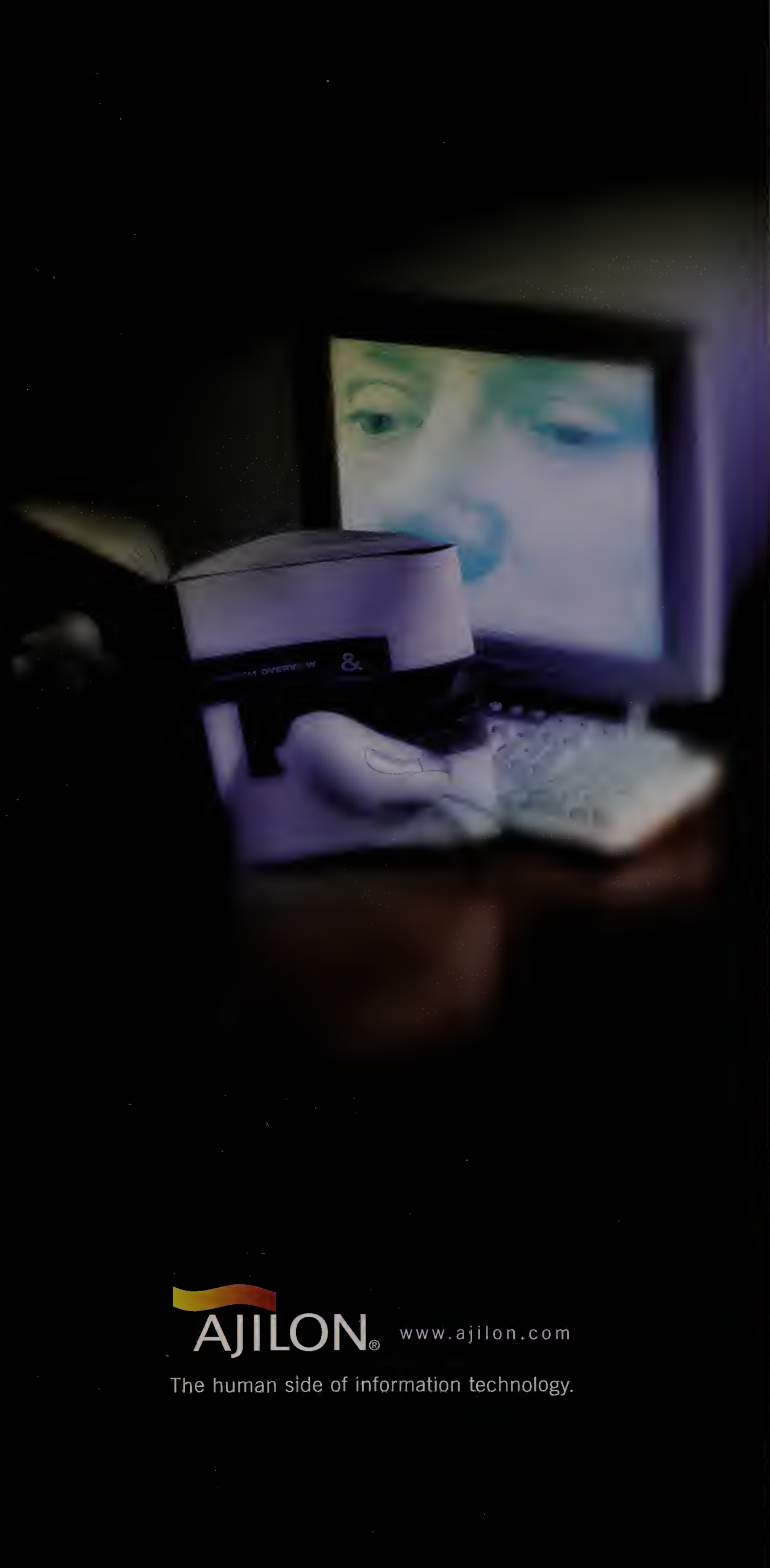
Tempered Radicals: How People Use Difference to Inspire Change at Work
By Debra E. Meyerson
Harvard Business School Press,
2001, \$24.95

ROCKING THE BOAT while remaining in your seat isn't the easiest thing to do, but that is the role of the tempered radi-

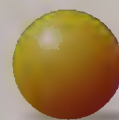
BOOK TALK

“A company's ethics or character is defined in the minds of stakeholders not only by how it performs but also by how it lives out the values it holds. Actions become the reputation of a company. And corporate reputation in today's realm of open communications and instant news has never been more critical.”

—From *Stakeholder Power: A Winning Plan for Building Stakeholder Commitment and Driving Corporate Growth*, by Steven F. Walker and Jeffrey W. Marr (Perseus Publishing, 2001)



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GLOBAL ENTERPRISE

Stopping Traffic

THE NUMBERS are staggering. Two million children are forced into prostitution every year. Almost 200,000 Nepali girls are sexual slaves in India. And more than 50,000 women are trafficked into the U.S. every year. The human-trafficking trade is thriving, and a research project under way at the Paul H. Nitze School of Advanced International Studies at Johns Hopkins University is using IT to try to stop it.

The Protection Project is a legal research institute that began in 1994 with a mission to gather and disseminate information on human trafficking. In March 2000, the project's coordinators launched a massive searchable database online (www.protectionproject.org), containing human rights reports, human-trafficking and extradition laws from almost every country

in the world, survivor stories and maps of trafficking routes. This database presents a worldwide picture of just how widespread human trafficking, prostitution, child pornography and illicit adoption really are.

While usable by anyone, the database is targeted toward the people fighting this scourge: law enforcement agencies, non-governmental organizations, human rights organizations and academics. Laura Lederer, director of the project, says the site has already had an impact in the international community. "We're getting around 10,000 visits a month to our website, and we know prosecutors are using it because we've fielded phone calls from them," she



The Protection Project can help keep these kids safe.

says. "And we know it's being used by [non-governmental organizations] such as relief and development organizations, advocacy organizations, service providers and others in countries around the world."

This is one site that will welcome a lot of traffic.
—Eric Berkman

HOT TOPIC



E-BUSINESS

GE: Destruction Pays Off

By Meridith Levinson

In 1999, GE embarked on a strategic planning exercise known as Destroy Your Business (DYB). Each unit of the organization visualized how it might be crushed by the dotcom juggernaut, on former CEO Jack Welch's premise that if a company didn't identify its own

weaknesses somebody else would do it for them. (See "Destructive Behavior," July 15, 2000.)

During the process, the business units discovered how they could use the Internet to their advantage, a concept that came to be known as Grow Your Business (GYB). We wondered whether GE was still gung ho about DYB/GYB now that the threat from Internet startups is a whimsical memory, so we went back to GE to check in.

It turns out General Electric's interest in growing its business through the Internet hasn't abated. What's more, now the company is focusing on harnessing the power of e-business by digitizing its internal processes. John Seral, vice president and CIO of IT and e-business at GE Plastics in Pittsfield, Mass., calls e-business "a phenomenal tool"

for delivering products and services to customers.

Indeed, GE Plastics conducts more than 50 percent—an estimated \$3 billion—of its business over the Web (up from 15 percent or \$1.5 billion in 2000). To handle this volume, Seral has to ensure that GE Plastics' service and fulfillment lives up to GE's Six Sigma quality standards. For instance, if a customer orders a colorant online and it is in inventory, the colorant is shipped to the customer right away. If the product is not in inventory, Seral says, the inventory system sends a message to the manufacturing plant indicating that the plant needs to fabricate the product and deliver it to the customer ASAP. He adds that GE Plastics is able to deliver materials to customers within two days of the date they've specified 98 percent of the time.

"Destroy Your Business woke us up. Grow Your Business was a home run," Seral says. "Digitization is the third step. It's taking the costs out of your internal processes while continuing to grow your business on the outside." And judging by the company's numbers (GE hit its second-quarter earnings on the nose), its investment in digitization is paying off—in spite of the economy.

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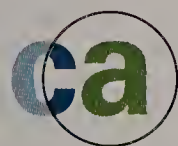
Andrew Winer, CIO, Myers Industries, Inc.

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Peer to Peer

Field-Tested Ideas from CIOs for CIOs

Birds of a Feather

Local CIO gatherings provide a unique way to join forces with your peers

BY JOHN A. ZARB

I RECENTLY ENJOYED a great evening with a bunch of other IT professionals from the Toledo, Ohio, area. We met to discuss our trade, have a few drinks and enjoy a meal together. The experience got me thinking about the importance of groups like ours, and I'd like to share some of my thoughts with you.

We call our group the Toledo Area CIO Forum. It was conceived in 1996 over a lunch I had with Owens Corning's CIO at the time, Mike Radcliff. We both had been CIOs in other communities and were familiar with the benefits of these types of organizations. We agreed to create something in Toledo and see how it worked.

During the past five years, we have met, perhaps, a dozen times. At each of these meetings there have been more CIOs who considered the group worthy of their involvement, and there has also been a better job by the meeting's host (one of the group) on facilitation and presentation. There are few other times when CIOs can sit in a room with true peers, and this group has become an important part of our working lives. I find it invigorating and helpful in my personal growth as well, and I know some value rolls over into my company too.



Strength in Diversity

For the most part, the companies represented in our forum don't compete. This makes it all the more legitimate. We have some automotive supplier companies, several glass industry companies and a few health-care industry organizations, and we've recently added a few members from the academic and public arena.

The mix is broad, but the conversation never slows because we share similar challenges. Whether we're in charge of the IT agenda at a museum or a petroleum company, most of the entrees on our respective "plates" are common. The best approaches to solving these common problems are not always the same, but the value of discussing them in this informal setting is immense.

Not only have we learned that we share many of the same issues, but we have become close as a group. We don't

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hesitate to call one another to inquire on a specific issue, request a benchmarking session or propose a collaboration.

We have discovered that many of us are “drivers” at the office—that is, we strive to load up and execute. At our forum, on the other hand, we “chill.” We listen more and appreciate the wisdom that surfaces. It is not unusual to have someone pull out a PDA and jot notes.

Over the years, the group has focused on many topics, some specific to the times (Y2K), others a bit blue-skyish, and most very predictable. We have had a few professional service companies come visit, with the intent to spread the

thinking that any such publicly funded “coordination” group was just a front for a time-wasting, fund-raising entity that would merely tap us for knowledge to share with politicians.

I was very wrong. ITANO is made up of a number of small to midsize companies that represent a wide range of the IT players in the region, from one- or two-person start-ups to large organizations. The group takes a practical approach to linking providers with users at many levels. ITANO has positioned itself as a neutral player between the IT organizations in the large, manufacturing-oriented

companies that make up the base of our local economy and the growing, entrepreneurial businesses that represent the possible future—bringing together both ends of the spectrum. Acting as a regional trade association, ITANO helps facilitate training seminars, technology updates and networking events that are

Aggregating our purchasing power has netted us a stronger position with several vendors—many of which showed little interest in us individually.

word on what one of the forum members might feel is important. We have always warned the provider not to sell, as the group would not tolerate that after 6 p.m.

We’ve also collected statistics among us as to how many seats of a particular product we collectively had or how much in the way of traffic goes through our telecomm lines, and this has netted us a stronger position with several vendors—many of which showed little interest in us individually. For instance, two years ago several of our members were having trouble getting Microsoft’s marketing attention, so we invited some representatives from the company to a meeting so that we could introduce ourselves. We counted the number of Microsoft operating systems represented around the room, and that got their attention. Lo and behold, we were subsequently invited to Microsoft’s headquarters for a visit. We are planning to do this “rollup” again so that we can take advantage of more opportunities to spread our tail feathers, so to speak, to the vendor community.

Looking Forward

In the past couple of years, Owens Community College and The University of Toledo have joined us to learn about our present and future staffing needs. We ask them to encourage students to understand that this largely industrial town is full of IT positions and opportunities. These academics have added much as they bravely challenge our CIOs to lay out what it is they expect the schools to deliver.

In the past year, an organization called ITANO—the Information Technology Alliance of Northwest Ohio—evolved in our big-little town. At first I avoided ITANO,

instrumental in building the industry in our town. We have even asked ITANO to facilitate our forum in the future, since it can both do a more professional job and also use the forum to reach further into the community—a clear win-win.

Our group is also considering joint application development that would allow us to broaden product specifications to meet all of our criteria and harvest it as a group. We suspect that the investment would be less, overall, and the product more complete than what we’d achieve individually. Plus, complex problems requiring high investment of resources could possibly even be contracted to the smaller companies represented by ITANO, supporting this growing industry while solving our challenges at the same time.

Finally, there is tremendous value in being able to associate with fellow CIOs in a setting that’s not so large you get lost in the shuffle. Particularly if you live in a nonmetropolitan area where chapters of associations such as SIM don’t exist, consider organizing an informal forum like ours. You will learn that there is great value to getting professional IT people together even just two to three times per year. Magazines, conferences, e-forums and other activities for networking are wonderful, but nothing can provide more consistent, gratifying and intimate results as a local gathering of birds of a feather. **CIO**

Do you have ideas of your own to share with fellow CIOs? Send them to Columns Editor Katherine Noyes at knoyes@cio.com. John A. Zarb is vice president and CIO for Libbey Inc. based in Toledo, Ohio.



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The Confidence Game

To reap outsourcing's greatest rewards, both client and vendor must trust each other

BY ERIC K. CLEMONS AND ELIZABETH T. GRAY JR.

AT THEIR BEST, outsourcing relationships can go beyond just reducing costs to create real value. But achieving both requires careful management. Effective outsourcing demands that client and vendor tightly coordinate activities and share information to ensure that unanticipated future needs can be met. For that to happen, the two parties must trust each other, even when the stakes are high and information is incomplete.

For a discussion of the risks of outsourcing, see "The Build/Buy Battle," Dec. 1, 2000. Here, we focus on the rewards that can be obtained through trust and a sense of shared history.

Renegotiate or Die

The ideal outsourcing contract is long-term, unambiguous and binding on both parties. Yet it must also address strategic uncertainty, permitting ongoing adaptation over time. And herein lies the central dilemma of outsourcing IT: Those sets of characteristics tend to be mutually exclusive. So if the contract has the first three attributes, it is going to require renegotiation at some time. Unless this is fully understood at the outset and

managed well, the result will often be failed renegotiations, leading in turn to a failure of the contract—sometimes at catastrophic cost to both client and vendor.

Renegotiating is rarely easy, thanks largely to four factors.

- The negotiations are usually "forced" in that they don't occur until they *must* occur—when one or both of the parties have come to find the existing situation unacceptable. They may feel not just vulnerable but exploited; one party may feel it is receiving too little service and paying too much, while the other may feel that it is working harder than agreed for too little compensation.
- Negotiations take place in an adversarial environment. One party's loss (overpaying or receiving poorly tested products) may be the other party's gain (overbilling or skimping on product testing).
- Renegotiations take place under conditions of uncertainty



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about actions and objectives. How hard is the vendor *really* working? What does the client *really* need?

■ Interpretation is ambiguous: Each party will view specific, individual actions differently, according to its particular risks and fears. This will color interpretations of future events and interfere with future negotiations in subtle ways that may have catastrophic effects on the renegotiation.

Differing Perceptions of History

The more perceptions of events diverge, the more each side will view the other's behavior as abusive. In such situations, most of us have no tolerance for uncertainty. We unconsciously act to eliminate it in a way that is consistent with our expectations and, too often, our fears. We find a pattern that seems to explain most of what happened, give the event a name (for example, "the Great Betrayal of the Y2K agreement"), stick our recollection of the event in its pigeonhole (vendor betrayal) and respond accordingly. No event ever fits perfectly within a pigeonhole, but once we have made our classification, we tend to ignore evidence that's inconsistent.

Clinging to an inaccurate pigeonhole causes us to misinterpret future events and thus to act inappropriately. Often we

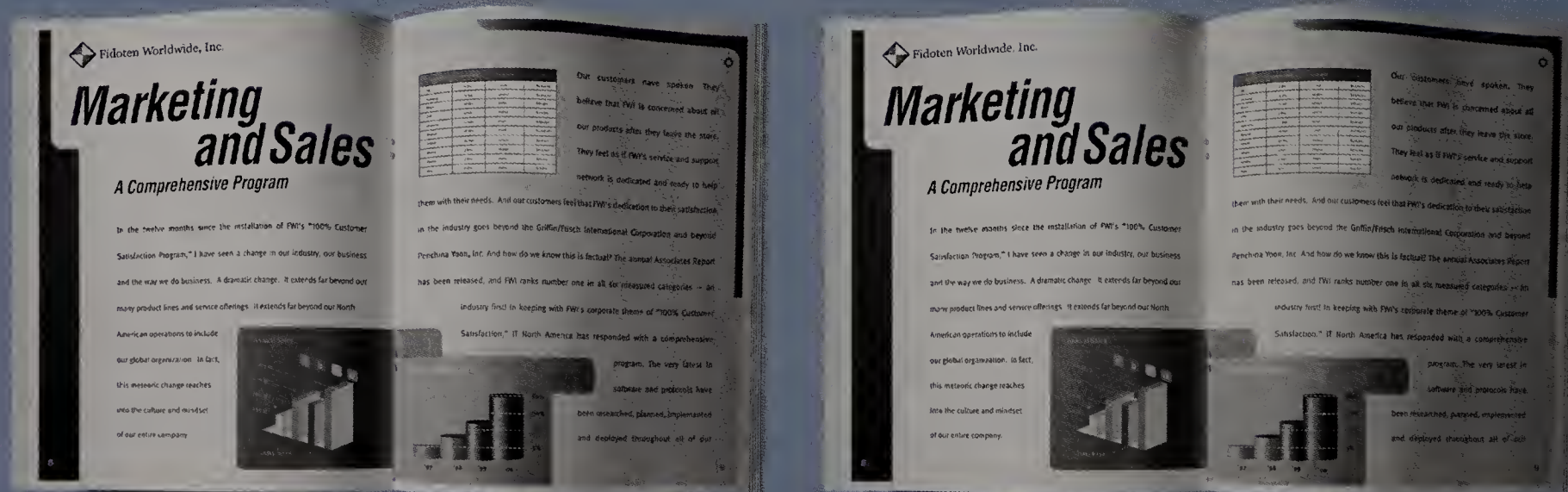
can no longer even perceive disconfirming evidence as new events unfold, and we cannot take appropriate actions to restore trust or the stability of the relationship. As this happens on both sides, the two parties can no longer speak to each other about events as they occur. In essence, they are no longer experiencing the same events—they do not remember the same details as significant, and they can barely understand each other when they try to discuss recent history. Neither side can interpret—let alone tolerate—the actions of the other.

In this way, relationships can spiral out of control rapidly. But it is important to note that both parties usually believe that they are acting in good faith and in an acceptable manner. After all, it's the other guys who are being abusive—we're just trying to protect our interests!

How to Get a Good Grip on Bad History

In situations like these, renegotiations are hard to perform successfully. There are, however, techniques that can improve the chances of success. We have counseled many organizations facing situations like this in outsourcing contracts worth about \$25 billion in aggregate. To help them move beyond the miscommunication and mistrust, we walk them through the fol-

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lowing steps. Note that a similar role can be performed by internal facilitators or executives who stand far enough "above the fray" to be able to remain objective.

- Elicit from the members of each party, privately, their view of the relationship's history and what they believe to be true. Affirm to each the reasonableness of their conclusions, given how they see it. ("Based on these facts, you're correct.")

- Privately walk each party through how history looks to the other side. Illustrate how each side is behaving reasonably, given what they believe they saw. ("Now you can understand why, based on their 'facts,' they feel so aggrieved.")

- Get each side to agree privately that whether or not the other party is properly informed or properly interpreting events, their actions can be explained without malicious intent, based on their interpretation. This significantly reduces animosity and improves future communications.

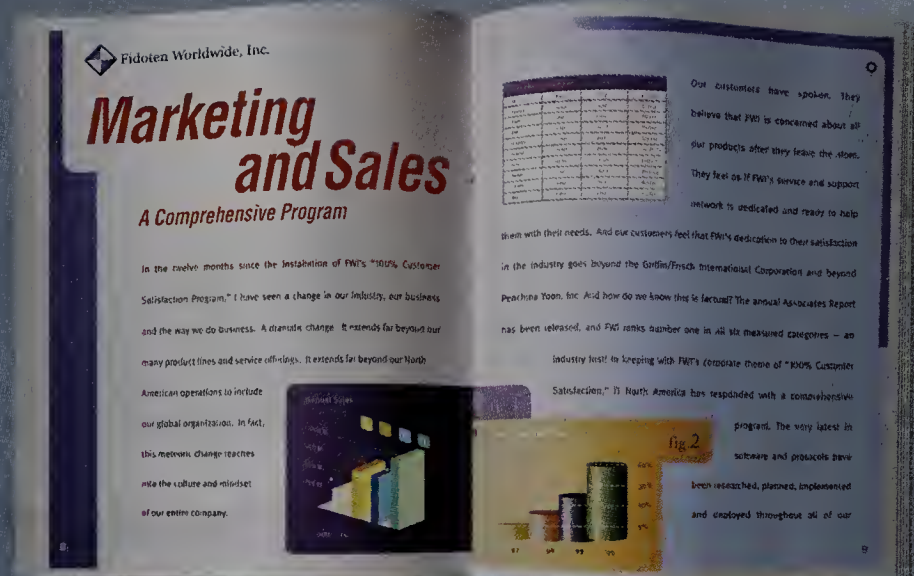
- Once the level of animosity is reduced, get parties together to share their perceptions of what value-creating opportunities exist, and how the value might be captured.

- Create among key individuals communication protocols that will enable each party to spot divergent perceptions in the future—before they do lasting damage.

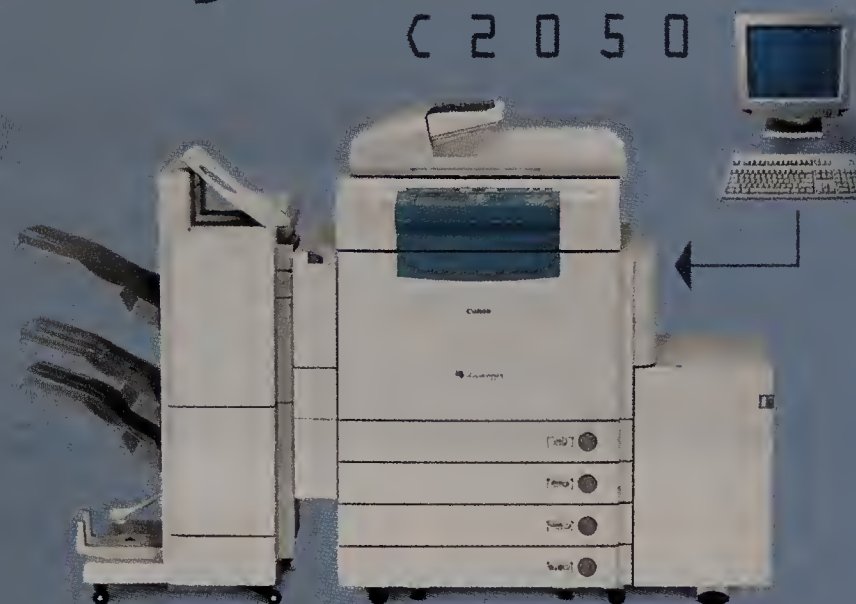
The desired result is not agreement on which view of history is correct, because that is generally both unknowable and irrelevant to future success. Rather, the objectives are to get each side to understand how the other views the current situation and to recalibrate the contract toward mutual value creation.

A good working relationship requires constant evaluation and readjustment if it is going to produce economic rewards. Those rewards will be much larger if both sides focus on cooperating to create value over time rather than on fighting for a greater share of whatever limited value is created through conflict. By developing trust and managing long-term relationships, both parties can enjoy outsourcing's fullest rewards. **cio**

Elizabeth T. Gray Jr. (below right) is managing partner of Alliance Management Partners, based in New York City. AMP specializes in the formation and ongoing management of strategic alliances and other forms of complex interorganizational collaboration. Eric K. Clemons is professor of operations and information management at The Wharton School of the University of Pennsylvania, and directs the research program on Information Systems, Strategy and Economics. E-mail feedback to Columns Editor Katherine Noyes at knoyes@cio.com.



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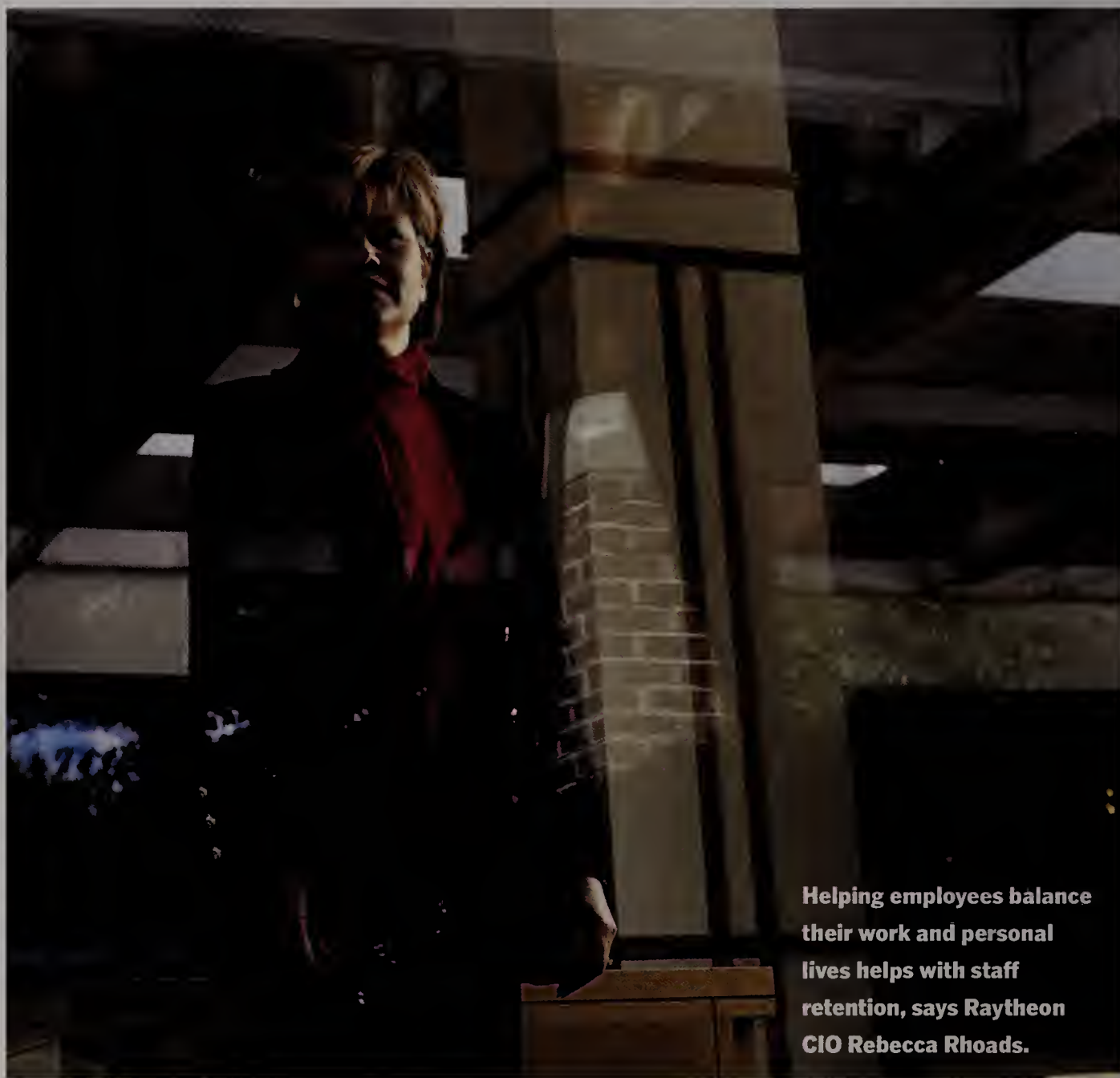
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Balancing Act

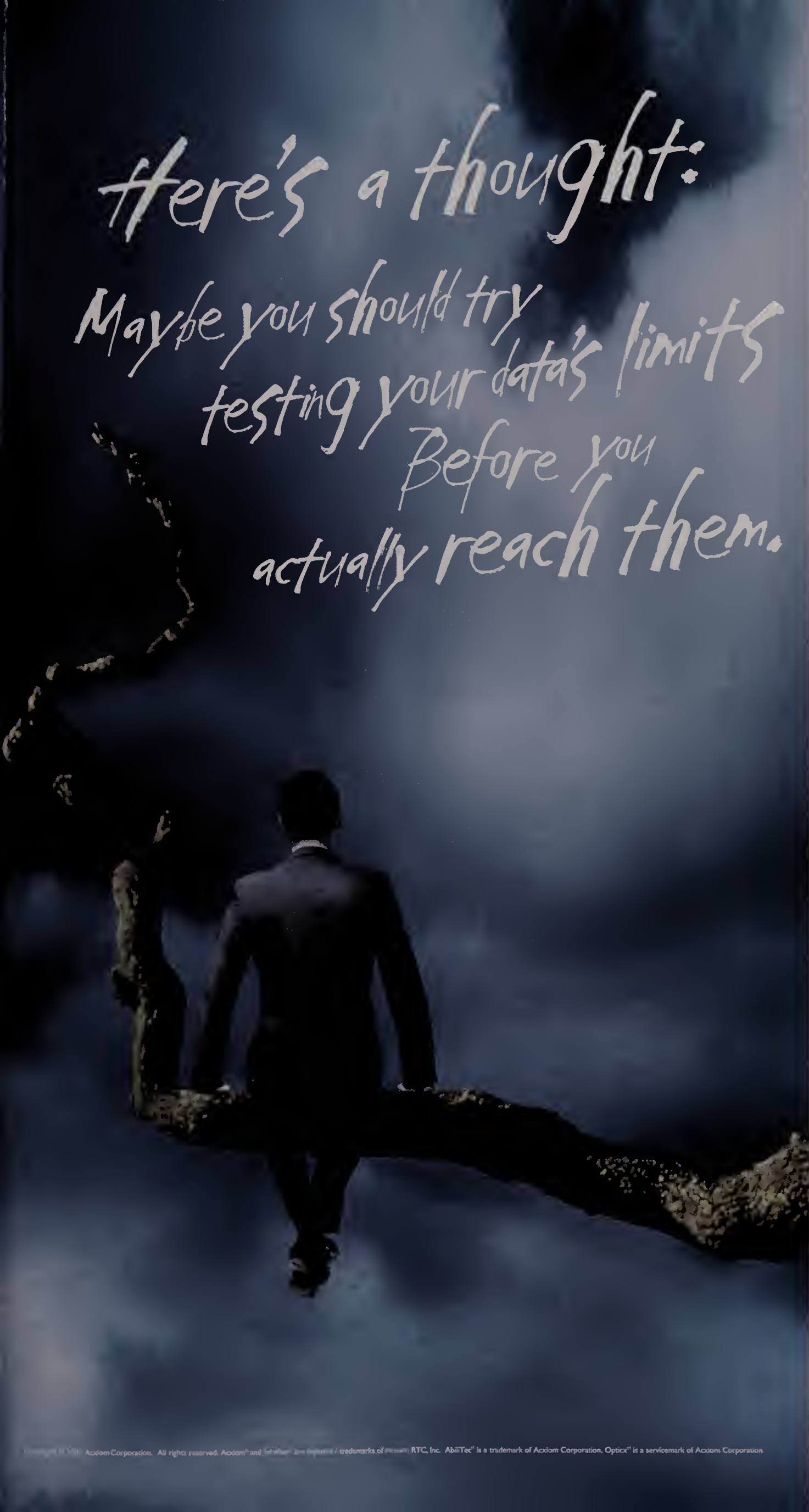
Are friendly work-life practices mere recruiting and retention tools, or do CIOs get to have a life too? **BY DAVID T. GORDON**

DIEGO SAENZ TOOK HIS FAMILY TO A FLORIDA resort for Memorial Day weekend this year. While there, Saenz, the former CIO of Pepsi Latin America and Wackenhut who's now president and COO of Intelligent Content, conducted what amounted to a family performance evaluation. He and his wife wrote out an annual set of objectives and talked about what should change and what

shouldn't, even consulting their 3- and 7-year-old sons. They then made a master plan to reflect everyone's wishes and goals, linking all their work, church, school and personal priorities in one place.

Is this the dark side of the blurring of work and personal life? Is it the Management by Objective methodology taken too far? Far from it, Saenz says; by consciously prioritizing the demands on

PHOTO BY STELLA JOHNSON

A man in a dark suit is seen from behind, walking along a thick, gnarled tree branch that extends horizontally across the frame. The background is a dramatic, cloudy sky with soft light filtering through the clouds. The overall mood is contemplative and aspirational.

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HOT Seat

his time, he is acting on the importance of his family to him. "This is the sort of thing we do with staff all the time. Why not with family?" says Saenz, whose company is based in Weston, Fla. "When we get home, we often forget the same principles that make us successful at work."

In a time when work tends to intrude on personal time, particularly for executives, it's necessary to prioritize both so that work doesn't overwhelm and family life isn't neglected. Get on your friends' and family's calendars—and put them on yours. "It sounds cold, but you really do have to schedule time with your family," says Gary Baxter, CIO and vice president of Maine Employers' Mutual Insurance Co. (MEMIC) in Portland. "I have appointments with my wife and kids. And I would no more miss that time with my family than I would a performance evaluation with my boss or some other crucial appointment."

R&R: Recruitment and Retention

In recent years, the issue of work-life balance has become increasingly important to CIOs. As companies ratcheted up performance demands on IT organizations amid a high-tech labor shortage, managers faced an especially difficult challenge: how to get the most out of employees without driving them away into easily accessible greener pastures.

So now that the slowing economy has eased labor market pressures, is it no longer necessary to offer family- and lifestyle-friendly practices? That's a shortsighted view—flexible work arrangements remain valuable tools in any CIO's hiring and retention strategy, says Rebecca Rhoads, CIO and vice president of Raytheon, the Lexington, Mass.-based defense contractor. IT work is intense, sometimes requiring long hours and weekend work. Sensitivity to work-life concerns makes such sacrifices agreeable to all. "When you help people find balance or work through difficult stretches in their lives, you say, We want to be partners for the long haul," Rhoads says.

Saenz believes that flexible work practices make good bottom-line business sense.

"Our measurements of success are based on results," says Saenz. "We hire professionals. Working X number of hours isn't important. In fact, if you try to enforce a stringent schedule, then you get people working to the schedule, not to results."

Making It Work

Our survey on work-life balance

CIO surveyed 56 CIOs and 254 other IT professionals in June on how well they balance work demands and personal life. For full survey results, check out www2.cio.com/research.

More than half of our survey respondents said they do not have an appropriate work-life balance.

Areas being compromised:

- Health and fitness 65%
- Hobbies 53%
- Social life 53%
- Family 52%

Among CIOs in our survey, 59% said they do not have an appropriate work-life balance.

A majority of CIOs surveyed said they bring work home with them:

- Weekends 73%
- 3 nights per week or more 48%
- 1 to 2 nights per week 31%

Are employees who have flexible work practices more dedicated and productive? That question was the focus of a study published in October 2000 by the National Work/Life Measurement Project at Boston College's Carroll School of Management. The study of more than 1,350 employees and more than 150 managers at six major corporations, such as Lucent Technologies and Motorola, showed that most managers and employees favored flexible work practices. Three-fourths of managers said flexible work arrangements enhanced productivity, quality of work and retention.

The report's authors say the most effective work-life practice is "daily flextime"—giving employees the opportunity to vary their hours on an as-needed basis, such as leav-

ing early on certain afternoons to pick up a child from school or taking time one morning a week to take an elderly parent shopping. Nearly two-thirds of workers using daily flextime said they were satisfied or very satisfied with their lives.

Your Job, Yourself

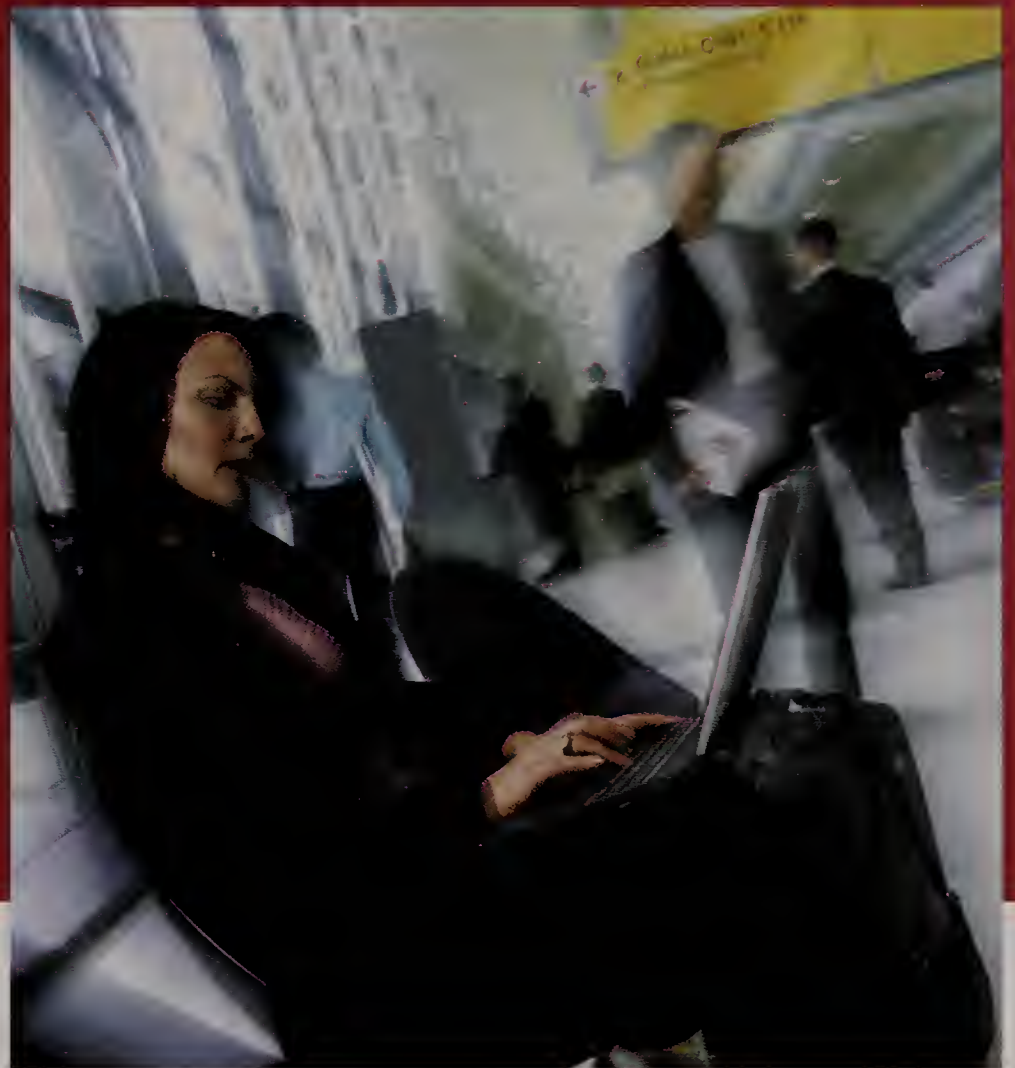
Work-life arrangements are more than just tools to keep good employees on board, of course. Balancing work and personal life can be especially difficult for CIOs. "IT systems run 24/7, so it can be hard as CIO to leave the work of the office behind," says Rickie Hall, CIO and vice president of ANC Rental, the Fort Lauderdale, Fla.-based parent of Alamo and National Car Rental. Yet Hall, who has two children, aged 5 and 9, accepts the challenge of juggling her career and parenthood with the same enthusiasm that helped her reach the executive ranks in the first place. "I chose to do both, and I'm very proactive about making it work," she says.

Making the work-life trade-off succeed requires taking steps both at the office and at home. Saenz has a "no Sundays" rule, which he made a condition of taking the COO job at Intelligent Content. "My family knows that I am theirs on Sunday," he says. "It doesn't matter if there's a big project going on or a proposal to write; my children always know that daddy will be available to them all day Sunday. I don't check e-mail or voice mail, and my staff knows not to call me that day." A deacon in his church, Saenz finds good business sense in the Fourth Commandment. "When God said to keep the Sabbath holy, he said that not for his benefit but for our own. We need rest."

At the office, don't treat employees like your children. Micromanagement hurts CIOs and their direct reports, says Raytheon's Rhoads. "You don't abdicate your leadership just because you're not there at a certain time. You can let go without letting go. The people who you're developing for succession should have that experience of working on their own sometimes."

Finally, take advantage of IT. The inno-

YOU CAN ONLY BE IN
THREE PLACES AT ONCE.



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COMPAQ
Inspiration Technology

HOT Seat

ventions of the past 15 years have undercut the notion that you have to be at your desk to do your job. John Halamka, CIO of CareGroup Healthcare System, a Boston-based hospital network, says weekends are reserved for family, when he and his wife take their 8-year-old daughter on mushroom hunts or canoeing trips. That doesn't mean he is out of touch for very long. He depends on a satellite pager, a cell phone and a BlackBerry PDA to manage his time. "I rely on IT utilities so I can deal with things as they come up," he says.

MEMIC's Baxter uses his 45-minute commute to dictate memos and notes with a digital voice recorder, which has IBM's ViaVoice speech-to-text software. Baxter spends the time saved on coaching Little League, coordinating Cub Scout trips, and serving on a parks and recreation committee in his town.

Still, despite the growing awareness among CIOs and their employees of the need for family-friendly practices, a balance of work and personal life remains elusive. In a survey taken earlier this year of 265 members of World Women in Technology, a networking community of IT women, more than two-thirds said they are worried about IT's round-the-clock demands. Forty-one percent said they have considered leaving their jobs as a result. Meanwhile, the National Center for Fathering reported in 1999 that 58 percent of Americans (both men and women) believe employers do not recognize the challenge fathers face in trying to balance work and family demands. That's up from 28 percent just five years ago.

That statistic demonstrates that work-life issues are not primarily women's work, as was once conventional wisdom. They are everyone's concern, says Mindy Fried, author of *Taking Time: Parental Leave Policy and Corporate Culture* (Temple University Press, 1998) and coauthor of the Boston College study on work-life. "Men are more involved with their children and family life than they used to be," she says. "So this is an issue that impacts all of society." ■

Share your work-life questions, dilemmas and solutions with us at letters@cio.com. David T. Gordon (dgordon@massmed.org) is a freelance writer in Cambridge, Mass.

MANAGEMENT BRIEFS **Negotiation Skills**

Step into the Ring

People tend to think of negotiation as the alternative to competition. Yet to be a successful negotiator, you need to train, practice and have a game plan.

"You just can't go into a negotiation on the seat of your pants," says Gerard Nierenberg, author of several books on negotiation and founder of The Negotiation Institute based in New York City. "You have

Beverly, Mass. It's also important to barter with things besides money, such as service agreements and training sessions, he says. "You want to cover a broad range of bargaining chips. The greater the flexibility, the greater the chance of a successful negotiation."

Cohen defines a good negotiation as one where the parties depart committed to their agreements—but it's

honest with yourself and your vendor," says Guy Batista, CIO of First Data Corp. in Atlanta. "Put the facts on the table and don't play games."

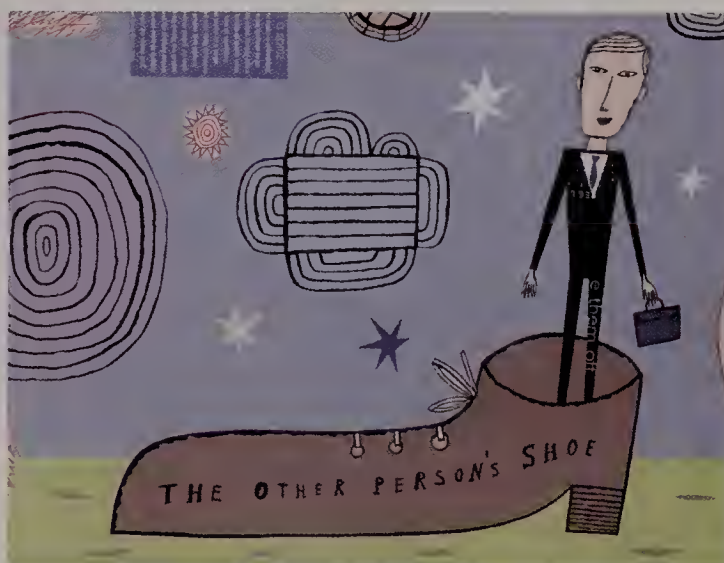
—Joe Kendall

Aim High

When you find yourself talking to salesmen who won't listen, try going over their heads to get what you want.

When Alfred Barea, vice president and CIO of Louisville, Ky.-based Baptist Healthcare System, needed new intensive care unit software for his medical staff, the vendor's salespeople focused on their products rather than Barea's needs. It wasn't until he addressed the COO of the vendor company that he got his message across. "The defining moment was the COO understanding [the salespeople] really weren't listening and had not done their job," Barea says. The COO came back a week later with a contract that met Barea's expectations.

Talking to top execs can cut through the sales babble and help a negotiation get down to real deal-making. Says Barea, "Sometimes you just don't have time for vendor blab." —J.K.



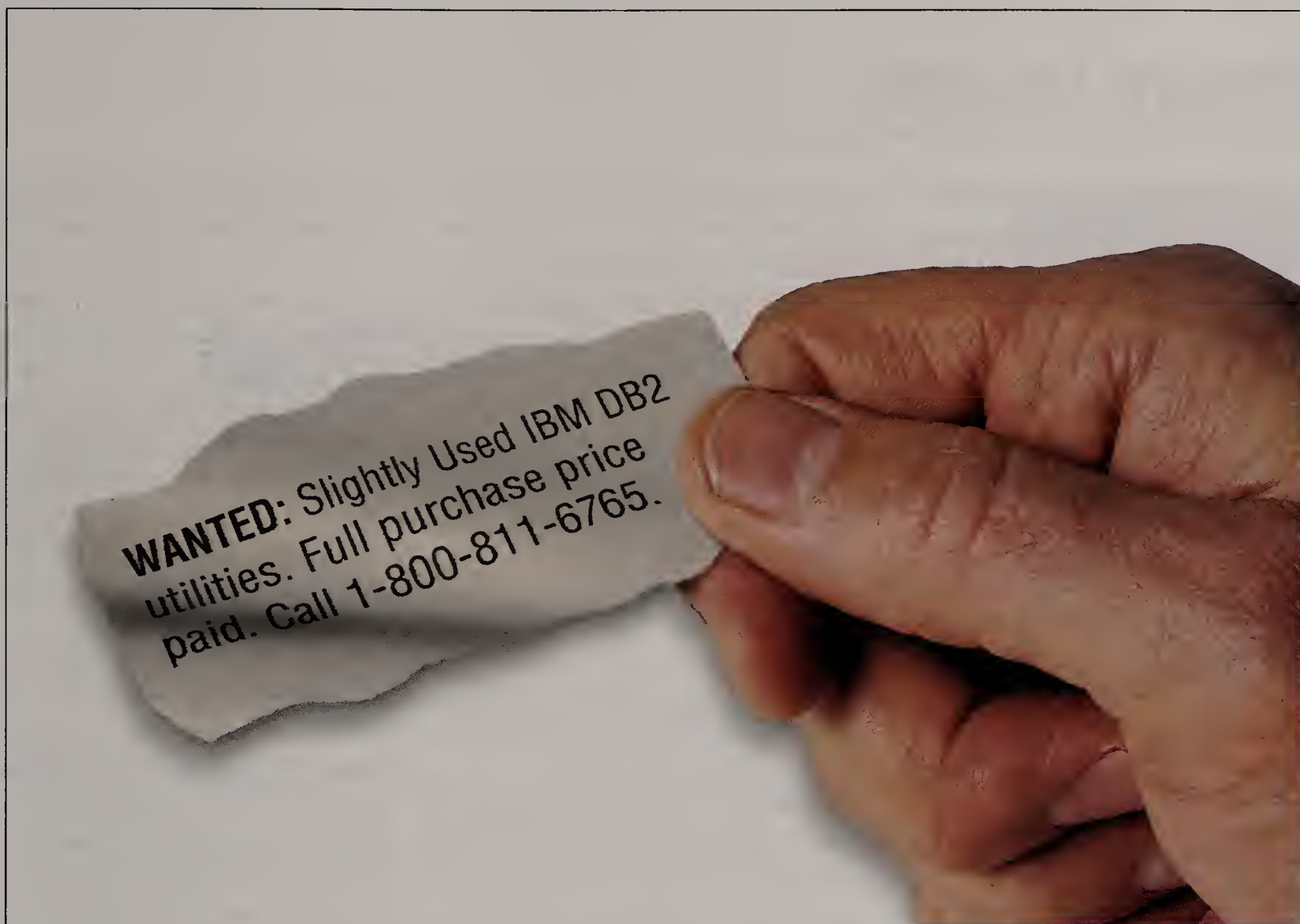
to put yourself in the other person's shoes, understand their needs so you can get what you want."

Preparation is the key to successful negotiation, says Steven P. Cohen, president of The Negotiation Skills Co., a consultancy based in

critically important to know when to just walk away. "If you don't know when to take a walk, you can't make a decision that makes common sense," he says.

A game plan is important in negotiation, but gamesmanship will kill the deal. "Be totally

For more on negotiation and other management skills, see our Leadership and Management Research Center at www.cio.com/research/leadership/tools.html.



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HANDS ON | SUSAN H. CRAMM

Software Insanity

Break out of the software development cycle chaos

ONE DEFINITION OF INSANITY IS DOING THE same thing over and over yet expecting a different result. Our own form of IT insanity is that we continue to use software development approaches that are tired, worn out and destined for failure.

You've probably heard of "Chaos '98," the Standish Group study that found that 75 percent of software projects fail because they are late, over budget or poor quality, or all of the above. For projects valued at more than \$10 million, the failure statistic becomes 100 percent. The West Yarmouth, Mass.-based Standish Group came up with four conditions that it says will improve the likelihood of project success:

- Executive management support and user involvement.
- Clear statement of vision, objectives and requirements.
- Proper planning, realistic expectations and frequent milestones.
- Competent project management and focused staff.

In my experience, CIOs do a pretty good job at getting the right level of executive management support and user involvement. You would love to have more, but most projects have steering committees and a project sponsor fighting the good fight. Fulfillment of the rest of the criteria is spotty. That is why so many CIOs have too many projects going on, many being done the wrong way, many not worth doing at all.

Projects go astray in many ways. Often they are in need of a purpose. One of my clients in my coaching practice walked into a new CIO job and took inventory of the IT projects in progress. The majority lacked well-defined objectives. That's the response of a team with no clear mandate.

This happens so easily in IT. Your business partners have a great idea, for instance, and want to get moving on it. But you wait too long to respond to their requests because you're tied up with other work. When the pressure builds, you delegate the project to an already busy director or project manager and

hope for the best. That person delegates it in turn to one of her busy analysts, who then works with his business counterparts to read the minds of the senior executives who came up with this brainstorm. To break out of the cycle, my client challenged his direct reports to define the value and objectives of their initiatives. His employees and their senior business partners quickly instigated valuable direction-setting conversations.

Other times the project mandates are clear, but CIOs try to tackle the

project by applying a waterfall development approach—a slow, step-by-step process in which no task is begun until the previous one has been completed. You know you're dealing with a waterfall project when you see a discovery period of three to six months and more than a year elapses before any software is delivered. The Standish Group indicators for projects with a high likelihood of success comprise a six-month duration from start to finish, no more than six people devoted to the project and less than \$750,000 funding committed.

Many of my clients get trapped into the waterfall approach by default—they don't know how to compress development cycle times. Others adopt the waterfall approach against their better judgment because they purchase software packages that are not easily broken into digestible bites, either because of software design or pricing. One of my clients had every intention of splitting her ERP effort into smaller deliverables only to discover that the benefits were two years away because of the software package's dependencies. (To add salt to the wound, she had to pay for the entire product up front.)

Finally, many IT projects suffer from inadequate resources. I don't mean money; most of my clients say they have more project money than they can spend well. Their constraint is the lack of qualified project managers. CIOs' project agendas are bulging. They try to fill internal leadership voids with consultants or contractors—but those must be managed with the very leadership resources that needed supplementing.

In short, many CIOs have set up a cycle of project failure. While everybody agrees that there is a problem in software development, the path out of the mire isn't as obvious as the Standish Group researchers believe. Software project insanity is deeply embedded in our companies and IT

(Continued on Page 75)

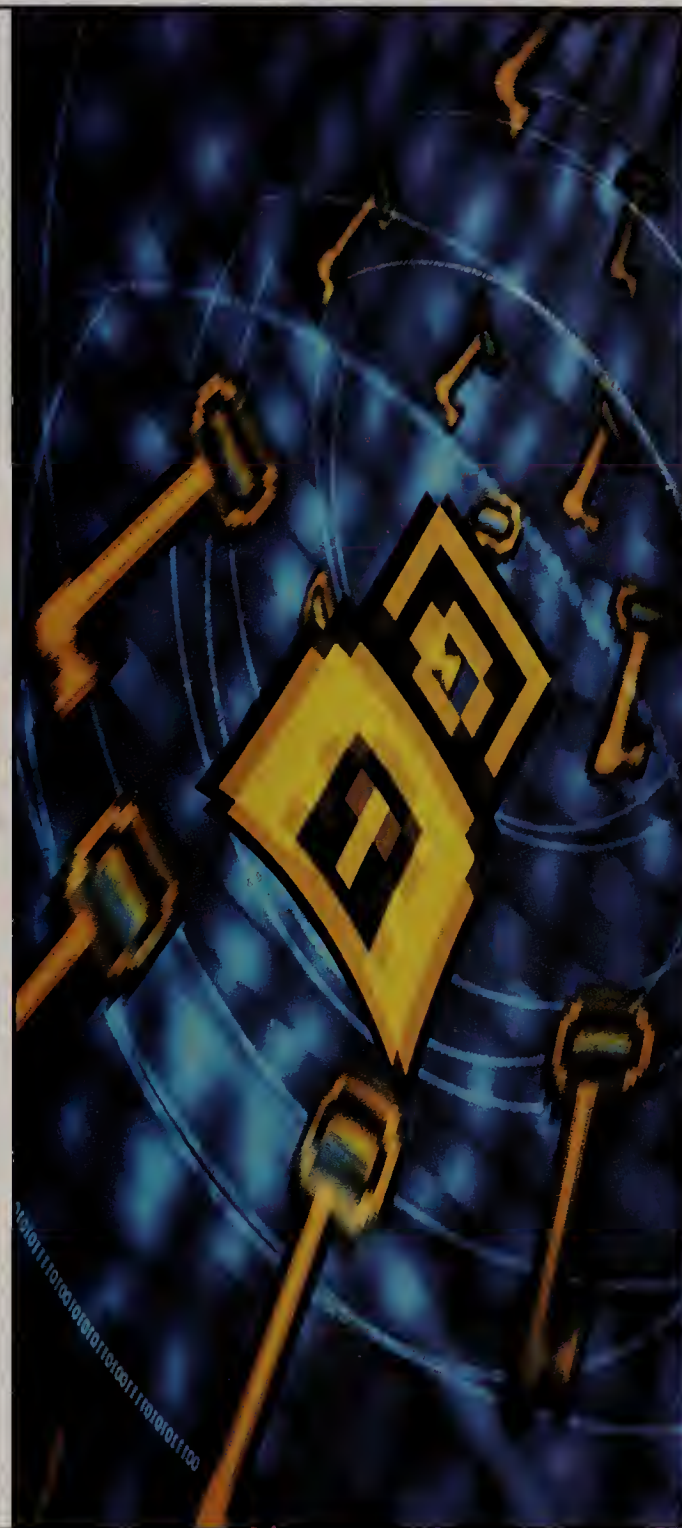


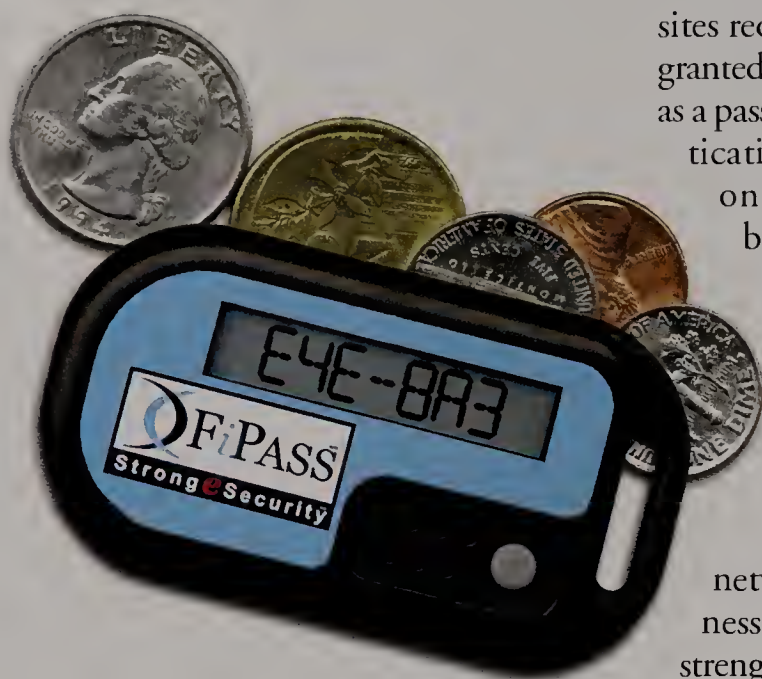


Applying Two-Factor Authentication Across the Web

The FiPass Platform Enables Identity Verification of Anyone, Anywhere, Across Multiple Web Sites Via a Single Token.

The Internet has opened up a Pandora's box of new potential security problems and has significantly upped the ante for corporate Internet security. While most CIOs have met the challenge of network security within the four walls of the company, they face a learning curve when it comes to protecting the "front door" where hundreds of thousands of transactions occur via the Internet. →





The FiPass Token

Gaining access to most of these Internet sites requires only a static password. Access granted on a single piece of information such as a password is known as one-factor authentication. Because of the vulnerability of one-factor authentication, security breaches are increasing exponentially as more companies engage in e-business. The solution is to require two-factor authentication.

Corporations and government agencies have utilized two-factor authentication for years to verify the identities of users on their private networks because they knew the weakness of single-factor authentication. The strengthened security protocol requires two pieces of information unique to a user, providing an additional layer of security.

Identity Theft

Using just a password, i.e. single factor-authentication, for the Internet transmission of social security numbers, bank and brokerage account numbers, and any other personal information is an open invitation for criminals to gain access to a person's most private information and assume their identity for illegal purposes. Sean B. Hoar, assistant U.S. Attorney, District of Oregon, calls identity theft, "the crime of the new millennium." Realizing the seriousness of identity theft, Hoar issued a USA Bulletin on identity theft and how to avoid it. Hoar comments, "It is

estimated that identity theft has become the fastest-growing financial crime in America and perhaps the fastest-growing crime of any kind in our society."

Additional avenues for password and identity theft are opened up by the increasing number of wireless applications that allow transactions from handheld devices such as smart phones and PDAs. People are now entering their passwords in various public places such as restaurants, convention floors, park benches and airports. This increase in public access to the Internet makes it even easier for criminals to steal passwords. Although checking bank balances or e-mail in a hotel lobby, while waiting for a taxi in Manhattan or while standing in the check-in line at the airport may be convenient, concealing your online activity becomes increasingly difficult. These behaviors can lead to identity theft, financial losses to individuals and companies, and potential costly legal action.

CIOs need to discard the "it only happens to the other person" attitude. The Computer Security Institute, with the participation of the San Francisco FBI Computer Intrusion Squad, conducted a survey in 2001 of more than 500 computer security practitioners in the United States. These included corporations, government agencies, financial institutions, medical institutions and universities. Eighty-five percent of respondents had detected computer security breaches in the past year.

Secure Computing: Experience and the Right Technology

For more than 15 years, Secure Computing has provided security products consisting of firewalls, Internet filters, and two-factor authentication for corporate intranets and extranets with SafeWord. Secure Computing's entrance into corporate security began with its Sidewinder firewall. The Sidewinder has never been penetrated. In a test using an 11-server extranet, hackers were invited to attempt unauthorized access. The extranet ran for a year, with more than 23,000 sustained attack attempts, but not a single breach occurred. SafeWord protected the database server and e-mail servers in this test.

FiPass's use of SafeWord technology has become even more important as e-commerce has shifted the security focus from keeping intruders out to letting the right people in—a trend that turned the entire security segment of the industry around. "We now want individuals to take orders and pay bills using business systems that companies previously kept hidden from the outside world," says Carr Biggerstaff, senior vice president at Secure Computing.

FiPass Founder and CEO Sean Brennan adds, "We selected Secure

Computing because of their superior software and token technology, which includes unlimited scalability."

In this new market, companies that are still using only a password for authentication are finding that the FiPass solution using the hardware or software tokens provides the answer. "Millions of companies are on the edge of conducting e-business and e-commerce. They are aware of the potential for Internet attacks and are very sensitive to the risk of using fixed passwords. These companies are looking to solutions like FiPass," comments Biggerstaff.

SafeWord Structure

SafeWord is comprised of four major components. Primarily, there is a user directory database where all of the user identities exist. The database has an authentication technology that can process the hardware or software token information for FiPass, as well as smart card information, passwords, fingerprint reader, digital certificates or other end-user authentication means. The database holds custom-defined user roles such as

Losses reported by just 186 of these organizations totaled more than \$377 million. It is likely that companies with weak authentication will soon become one of these statistics.

Until the FiPass two-factor authentication platform, there was no universal Web-based solution that allowed CIOs, catering to hundreds of thousands of Internet users, to feel comfortable that the end-user they were letting in was in fact the user they intended to let in.

"I've been a publisher in the technology business for over two decades, and we've reported extensively on the increase of identity theft leading to fraud," states Joe Levy, CEO and president of CXO Media Inc., whose publications include *CIO* and *Darwin* magazines. Levy added, "It's absolutely the right time for FiPass to be offering their authentication service, and I strongly suggest that any online business should become a FiPass Secured Site."

FiPass Founder and CEO Sean Brennan adds, "One-time passcode tokens have a proven history of protecting employees at their given corporations. Today, with the growth of the Internet, it's imperative to expand this time-tested technology through FiPass, enabling companies to offer the benefits of two-factor authentication to their customers."

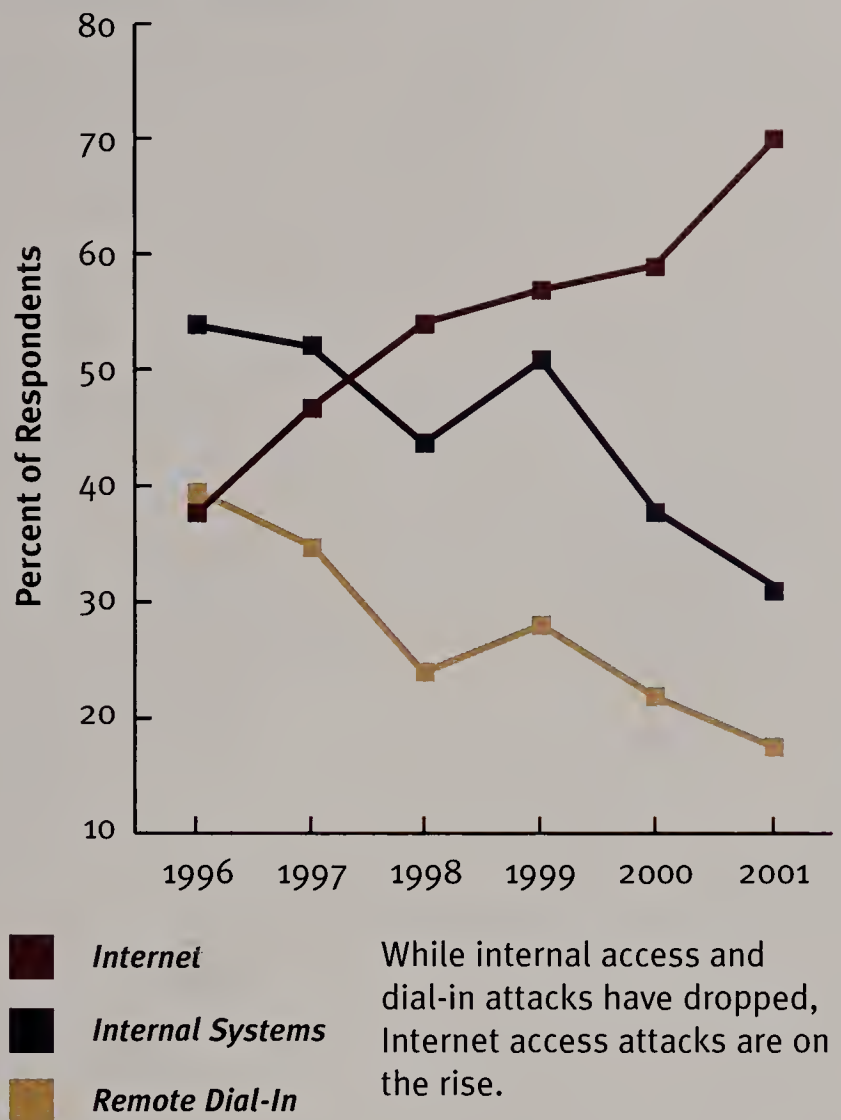
Missed Opportunities

The burgeoning number of companies offering online financial transactions only adds to

the importance of strong authentication over the Internet. According to a poll conducted by Grant Thornton, more than 90 percent of all U.S. banks plan to take their business online. In addition, most brokerage houses are allowing their customers to trade securities via the Internet. Forrester Research predicts that by 2003 total U.S. assets managed online will reach \$3.1 trillion.

As more and more online businesses attempt to grow their customer bases, consumers thwart those efforts due to feelings of insecurity. Gartner G2 research showed that for consumers doing Internet transactions, 86 percent are very concerned about security for bank and brokerage account numbers, while 83 percent were troubled by the thought of entering social security and credit card numbers. Approximately 60 percent said that security and privacy concerns stop them from doing business on the Web.

Point of Attack



Source: CSI/FBI 2001 Computer Crime and Security Survey

partners, outside salespeople, tech support or whatever roles are needed to define the makeup of the workforce that requires access. The database also holds the privileges associated with these roles. As an authentication management service, FiPass doesn't involve the user role definition or privilege authorization, just the identity verification of the user.

The second component is the system administration console to control and manage the database. SafeWord permits an unlimited number of system consoles to serve distributed organizational centers.

The third component consists of agents that link to the applications. The agent's task is to interrogate the users for their identity, confirm the identity with the SafeWord central server, and check the role and privileges. If the identity is authenticated, the agent allows the user to connect and engage in the permitted transactions.

The final component is the end-user's token authentication device.

Time Is of the Essence

Secure Computing's belief is that network security does not rest on one

particular technology like a firewall. It is based on a layered approach that combines a variety of methods, techniques and products; and FiPass is an essential element.

The market need for two-factor authentication is immediate. Because FiPass does not require drastic system changes, implementation is rapid and effortless. "FiPass is making it easy and affordable. And they are doing it in the e-commerce market, probably the most sophisticated segment in the world," says Biggerstaff.

Biggerstaff adds that, "FiPass comes at a time when the market understands it needs the security, and the customers are ready for it. FiPass offers companies that might have hundreds of thousands of users using fixed passwords, an option that was not available a few years ago—a FiPass token."

"Our partnership with FiPass is very strategic to Secure Computing as it extends the availability of strong authentication from organizations to consumers," says Biggerstaff. "With SafeWord, FiPass provides consumers with the ability to gain secure, authenticated access to a multitude of e-commerce services with a single FiPass token."

How It Works — FiPass Technology Overview

1. A customer enters their username and password, and then enters their FiPass code from the token.
2. Your servers verify the username and password.
3. Your servers then communicate with our servers over a secure channel.
4. FiPass verifies the information and returns an Authenticated or Not Authenticated message.
5. If the user is Authenticated, you are now empowered to open the lines of communication between the user and your servers.



token that supplies a unique one-time-use alphanumeric code. It is like using a different magnetic strip card every time an ATM transaction is made, which renders the old card useless to a thief.

As more companies become FiPass Secured Sites (FSS), people doing business with their banks, brokerage houses or accessing their medical records need only one FiPass token to safely access all of their accounts.

The Weakness of One-Factor Authentication

The vulnerability to criminal elements increases when only a single pass-

word is required to access accounts, transactions and personal data. Cyber criminals have developed many ways to hack a password. One method is social engineering, where a person's password is compromised by tricking the individual into revealing the password by posing as someone needing the information, like a field service technician.

Other means of discovering passwords are aided by bad habits of the end-users themselves. Many consumers use easily-guessed combinations, make infrequent changes, and often write their password down and leave it in conspicuous places, like on their computer monitor. Some consumers not only never change their password, but also assign the same password to all of their online and even ATM bank accounts. One-factor authentication facilitates a one-stop-shopping environment for criminals. With two-factor authentication, these examples would not create a hazard, as the other factor would also be needed.

Software cracking programs can easily discover many passwords by brute force methods employing search algorithms that use dictionaries and acronym lists. Other, more physical means include simply watching a person punch in their password on a cell phone or PDA. More sophisticated methods use electronic "sniffers" on network lines to monitor the characters being sent. With the FiPass token, even if the alphanumeric char-

The FiPass Universal Platform

Two-factor authentication has been used successfully for more than 15 years to secure intranets, extranets and remote dial-up access for company workers. FiPass now has extended that same proven technology to the Internet by developing a universal authentication platform that provides security and convenience to end-users conducting business online with any FiPass Secured Site.

Two-factor authentication technology is used daily at ATMs where customers need both their PIN number as well as the magnetic strip card. Even if someone obtains the

PIN number, the card is also needed for access. In addition, if the card is lost or stolen it cannot be used without the PIN. The FiPass two-factor solution also requires two pieces of information to validate a person's identity—a password and a hardware or software

U.S. Clearing Serious About Security

U.S. Clearing, a FiPass Secured company, handles the trade clearance and back-end administration for dozens of brokerage firms, mutual funds and banks. Mike Lyons, chief administrative officer for U.S. Clearing wants his company to be positioned as offering a strong additional layer of security to its client institutions so that those companies can offer FiPass to their customers. Lyons explains, "The timing is right for anyone handling transactions to be focused on security and specifically on authentication. Being FiPass Secured is smart because it communicates to our client companies that we are extremely diligent about verifying the identities of anyone making a transaction to be processed by U.S. Clearing."

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acters entered are illegally obtained, they will not be valid for the next access.

New technologies are constantly being developed to tighten the authentication process. These include encryption, digital signatures and access management technology. However, many of these technologies are expensive, require major changes to a company's networking infrastructure and present formidable system interoperability problems.

The reality is that the current widely used method of a single password for access is totally inadequate to serve the growing e-business marketplace.

The Time Is Now

Before Internet commerce became prevalent, security to CIOs meant keeping the "bad guys" out. This meant firewalls and intrusion detection. When e-commerce gained critical mass, the thinking shifted from keeping the criminal element out to allowing the right person in. This is when strong authentication practices became paramount—making sure that the person requesting admission to a Web site is really who he says he is.

Allowing only the right person into a Web site with one-factor authentication is nearly impossible. Hacking into a company by finding vulnerabilities in network systems has become a sophisticated science. CIOs and IT departments must be on constant alert and continually update their security measures to keep ahead of hackers. Hacking has grown to such an extent that regular hacker conferences are held.

Strong authentication is critical to a number of e-business sectors that simply cannot put off the implementation of effective authentication technology.

Banks: Most banks offer Internet access, either just to view accounts or to allow transactions such as transfers and bill paying.

Brokerage firms: Companies that allow customers to buy, sell and trade securities online.

E-commerce: Either B2C or B2B purchasing transactions where credit card numbers are used and/or held in the company's database.

Auction sites and e-exchanges: Companies or individuals put items out to bid and need to deal with validated vendors or bidders; large companies set up supply-chain sites for vendors and private exchange sites for invited bidders only.

Research firms: Companies that sell costly research via the Internet lose money when customers give passwords to others who then can use the research without paying.

Medical records: The privacy of medical records is critical. All hospitals, clinics and doctors are vulnerable. The Health Insurance Portability and Accountability Act (HIPAA) requires confidentiality of patient medical information with fines of

One-Factor Authentication Can Lead to the Loss of Revenues and a Lot of Negative Publicity

The one-factor password is the weak link in a security protocol because:

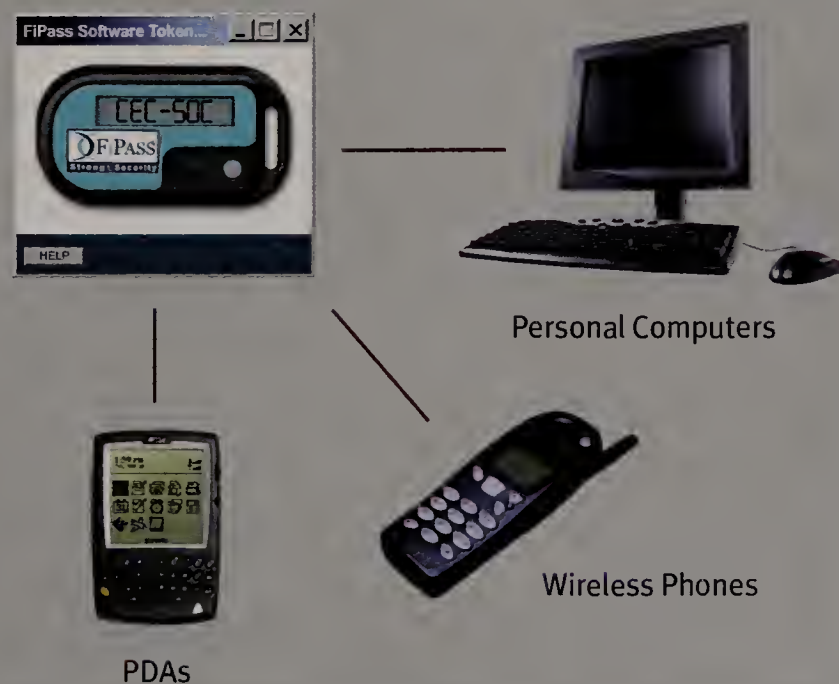
- only one piece of information is needed
- the password is fixed for some time interval
- criminals have numerous methods and software for password detection
- most people are not diligent about changing and securing their passwords
- people use easy-to-discover passwords like family names, birthdays and anniversaries
- people use the same password for multiple accounts

Not Just Hardware Tokens, FiPass Also Provides a Software Token Solution

In addition to the FiPass hardware token, the company also provides a software token. Like the hardware token, the software token generates a six-digit code, but it does so as it resides on a PC, PDA or cell phone.

To obtain a FiPass code on a PC, a user would merely click the FiPass icon, enter their PIN, and then click the button on the graphic of the token. Once the FiPass code appears on screen, the user can then proceed with his login at any FSS. The FiPass authentication process operates exactly the same whether the FiPass code was generated by a software token or a hardware token.

For users who spend most of their time online from the same PC, the software token provides a truly easy means to obtain added security to protect their online identities. For mobile users with a PDA or a cell phone in which they can install the software, the software token is an alternative form factor to the portable hardware token. When new users enroll for FiPass at any FiPass Secured Site, they will have the option to choose the hardware token or software token.



How a User Logs in with FiPass, Using a FiPass Hardware Token:

1. To login to your FiPass Secured Site, your customers access a modified login page and enter their username and password as usual.
2. Then they simply push the button on the front of their FiPass token.
3. This generates a six-character alpha-numeric FiPass code.
4. They enter the FiPass code into the appropriate field, and they're in. It's that easy!



up to \$250,000 for wrongful disclosure.

For the company engaged in critical financial transactions or highly valued or confidential information, the FiPass solution:

- permits existing security technology to remain intact
- allows the customer to use a single, easy-to-remember password everywhere
- supports multiple Web sites with a single token
- offers opportunities for hosting services

handling large numbers of users because it is fully scalable to millions of users

- presents portability options as it can be used wherever the user accesses the Internet, such as via wireless devices
- allows full scalability with no additional system overhead

End-User Ease of Use

Implementation of the FiPass solution is easy for the end-user. Users log in to an FSS and enroll by entering essential information such as name, address, phone number, e-mail address, credit card number and billing information. The end-user then immediately receives an e-mail confirmation number.

Next, FiPass mails the token to the end-user. The end-user now completes a simple activation procedure by entering the confirmation number, two token codes and the token serial number. This ensures fool-proof authentication of the enrollee. The next time a user enters any FSS, he needs only to enter a user ID, password and the unique, one-time FiPass code from the token.

With such remarkable ease-of-use, users are empowered to protect their identity. With token in hand, this newfound sense of control may translate to a greater sense of comfort and confidence about conducting online transactions.

Continued on page S8

Guidelines for Good Passwords

While two-factor authentication such as FiPass is one of the best methods of identity verification, choosing a good password is still essential, especially if you don't yet have FiPass.

Here are some rules when choosing passwords to reduce the risk of hacks:

DON'TS:

DON'T choose a password that uses public information about you, such as your social security number, credit card or ATM card number, phone number, birth date, driver's license number and so on.

DON'T choose a password that uses public information about your family or friends.

DON'T choose a password that is composed of any word or words that could be found in a dictionary, in any form or combination.

DON'T reuse old passwords or ones that are similar to your old password.

DON'T use your user ID, or any variation on your user ID, as your password.

DO'S:

DO choose a password that has no easily discerned significance to you.

DO choose a password that is six to eight characters long.

DO memorize your password. Never write it down.

DO use a password that has at least two alphabetic characters (a-z, A-Z) and at least one numeric (0-9) or special (punctuation) character.

DO use both uppercase and lowercase characters. Passwords are case sensitive.

Courtesy Bergen County Technical Schools

Q&A With Sean Brennan, CEO of FiPass

Is technology the answer to Internet security problems?

Sean Brennan: Yes, as hackers become more sophisticated, the technology that exists to prevent their activities needs to become more sophisticated. It's an ongoing cycle. However, the deployment of improved technology needs to be broadened to go beyond the online business. End-users need to be part of their own security solution and they should know what security technology is available to them so that they can protect themselves online.

How important is customer trust?

SB: Very important. One big obstacle for online commerce is convincing customers that their information is safe. That is why one of the fastest growing businesses in corporate America today is Internet security, and specifically online authentication. Companies can't afford to have an "it always happens to someone else" attitude, because eventually it will happen to them. And if it does, the financial losses could be substantial and customer trust destroyed.

Do the newer security technologies offer promise?

SB: While there are many new technologies offering security solutions, the picture is not clear. There are smart cards, PKI, retinal scans, fingerprint identification and other high-tech authentication technologies. The problem is that the newer technologies are changing faster than standards can be established. And many of the new solutions require costly infrastructure changes. CIOs need to consider how vulnerable they are to various security breaches, and then consider what technology they can use today that is effective, easy for them to implement, easy for their customers to use and a good value.

What's the advantage of the FiPass solution?

SB: Other authentication systems are not only very costly and require major internal changes, but they are not mobile. Retinal scans, for example, are fine, but you need a scanner at each location—that virtually eliminates mobile authentication. With FiPass, all an online business needs to do to become a FiPass Secured Site is add a few webpages and some communication code that allows its servers to talk to our authentication server, and then its customers' tokens can be used in any location, fixed or mobile.

FiPass has been described as layered-on security.

SB: That's because we don't take anything away or change what a company already has for its security protocol. We are just adding another level that makes it that much more secure for their customers.

Why haven't companies picked up on two-factor authentication before?

SB: They have, but they were only using it to secure their internal networks. FiPass authentication technology has been used for the past 15 years securing internal networks for more than 5,000 companies and 7 million people. It's just now that we have brought that same level of security to the Internet.

How does a company benefit from becoming a FiPass Secured Site?

SB: Once you become a FiPass Secured Site, you're part of the FiPass community and you become known as a site that is providing your users with an added layer of security. An online customer who is security-minded, and who originally obtained a token for use at his or her bank site, is likely to consider what online brokerages offer FiPass. Any site that is FiPass Secured is positioned to be more appealing to Internet users concerned about security.

Certainly financial e-commerce companies will be interested.

SB: Absolutely. High net worth individuals that trade securities online—people that have a million dollars or more in their accounts—are already asking for better security. No matter how much an individual has in an account, if they don't feel secure they won't go online to trade or bank. It's that simple.

What are some other important markets?

SB: The online subscription businesses, for example. These are companies that sell expensive research online. They are trying to ensure that the one person that bought the research gets the research—and no one else. The research market is 3.5 million people in the United States, so that's a big market. With the token and two-factor authentication, only one person can get that information. It's a big deterrent to people sharing passwords.

Another market with huge potential is health care, due to the Health Insurance Portability and Accountability Act of 1996 (HIPAA). The law requires safeguards to protect the security and confidentiality of patient information. Tens of millions of patient records require authorized access before information can be transmitted. Authentication provides the first step in that security process, and we provide a universal solution that can be implemented today.

How do you establish momentum going forward?

SB: The good thing is that there are 7 million people in the world who have the tokens now, and they are using them every day to get into their internal systems. That's a lot of accounts. Now they will be able to use the same technology for online accounts rather than solely in a closed corporate system.

Morningstar Investment Services Secures Identities and Access with FiPass

Morningstar Investment Services provides a wide range of financial and investment services for individuals and 60,000 investment advisers that range from financial planners and CPAs to banks. With Morningstar Managed Portfolios, advisers can take advantage of a range of integrated services and delegate portfolio decisions.

Both the advisers and their customers know that for financial transactions, impenetrable security is mandatory. "The clients want to make sure that only the authorized person is gaining access to the accounts," says Tom Florence, president of Morningstar Investment Services.

Morningstar Investment Services knew that at the core of security was a strong authentication system to make customers feel comfortable about placing and accessing their financial information online. To accomplish this, Morningstar Investment Services chose FiPass authentication management. "We were looking for a system that allowed only one person to get in to access their information based on two-factor authentication," says Florence.

Morningstar Investment Services is now secure with FiPass' two-factor authentication, knowing that its clients and its client's customers will be able to conduct business with confidence.

BUYandHOLD Gives Customers Secure Feeling

"You can't pick up a newspaper or turn on the news without hearing about instances of identity theft and other Internet fraud," says Michael O'Dea, executive vice president, COO and CIO of BUYandHOLD, an online brokerage firm.

BUYandHOLD is a brokerage firm targeting long-term investors. A customer can open an account and interact with it like a savings or 401 account. BUYandHOLD allows customers to invest in stocks on a dollar basis. "If you want to put \$50 into IBM, \$50 into Cisco, you can do it," explains O'Dea. BUYandHOLD's strategy allows the investor to dollar-cost-average over time.

The reports of fraud capture O'Dea's attention because BUYandHOLD customers have invested their money in securities managed by BUYandHOLD's unique online services, which cater to those interested in long-term investment opportunities. BUYandHOLD's customers access its Web site frequently, and many have significant amounts of money invested. Any nervousness their customers might have must be addressed.

To assuage any security fears its customers might have, BUYandHOLD decided to offer FiPass' two-factor authentication as an option for those customers who felt they needed an added level of security. "I know people who won't use their credit cards at restaurants because they don't want them out of their sight. We have to respect that attitude," adds O'Dea.

O'Dea explains that BUYandHOLD, as a financial institution, must always ensure that its customer information is protected. However, O'Dea recognizes that there are different levels of security that people feel they need, depending on their habits. O'Dea explains that a BUYandHOLD customer might want to guard against an instance where they walk away from the computer with their password taped to it, and desire the added protection.

The FiPass solution fit the bill to put BUYandHOLD customers at ease. "FiPass provides the kind of security we were looking for and we don't have to put in a lot of heavy infrastructure to support it," adds O'Dea.



The FiPass System

Continued from page S6

Easy on the Business Too

The FiPass solution places minimal implementation tasks on the e-commerce site and virtually no overhead once activated. As soon as the FiPass software is installed on the company server and the unobtrusive FiPass footprint is implemented, the site is added to FiPass' authentication service, and becomes an FSS. When an end-user enrolls, FiPass handles shipping of the FiPass token and billing. No other software or network changes are incurred.

The ease of implementation is made possible because FiPass provides:

- API for log-in modification
- HTML enrollment and activation forms as well as disclaimers
- client-side forms and validation code (JavaScript)
- onsite technician or consultant to support installation
- assigned representative to each FSS

FiPass will work with all popular Web servers, including Apache, IBM Web Sphere, IIS 4.0 (Windows NT4), IIS 5.0 (Windows 2000) and Netscape Enterprise Server.

Web Sites Cannot Afford to Wait

Statistics show that security incidents over the Internet are increasing dramatically as more sensitive transactions involving finances, cost-

ly information and personal information proliferate. The single, fixed password, even conscientious password management, is inadequate. If a company does not deploy two-factor authentication to help protect itself and its customers, it is missing out on a proven solution that has been the stalwart for internal network security for years.

The practical question any company engaged in e-commerce needs to ask is, "I want to take that critical step now or until a major breach of security occurs?" The basis of bulletproof security in any company is a well thought out layered security policy and infrastructure that is strictly enforced and monitored. Strengthening existing security by securing the front door, traditionally the weakest link in any company's security protocol, becomes a mandatory step. The forward-looking company can preempt authentication breaches with FiPass. It is precise, secure, highly scalable, easily implemented and immediately available.

FiPass' Brennan notes, "The growing threat in the online world involves issues of security and identity verification. We are confident that FiPass could lead the way in the evolution of authentication through the development of our Web-based platform."

For more information, log on to www.fipass.com and see our demonstration, or call 978.465.4654.

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HOT Seat

(Continued from Page 64)

groups—our cultures, belief systems and skill sets. CIOs need practical action plans and assistance to transform development approaches. Let me share a few gems that my clients and I have discovered over the years.

Develop conviction. The cycle of software failure is not just one issue out of many on which a CIO must focus; it is *the* issue. It blocks you from delivering value to your organization and extracts huge costs. Convince yourself by examining your track record with software projects. If you're like most CIOs, you'll see the problem. But until you develop an "I'm mad as hell and I'm not going to take it anymore" mentality, you are not ready to move forward.

Share the crisis with other senior executives. It's not just your crisis; it's the organization's problem, and it needs the attention and cooperation of everyone. What's shocking is that most of you have not shared this issue with your business partners. There is no upside to letting them think the delivery problems are unique to your organization. Unless you engage your colleagues' energy, you will be unable to mobilize support for the necessary changes in policy, process, skills and resources.

Redefine your job. Your business is not simply IT; it is innovation. You help your company develop hypotheses about where IT can make a difference. You and your business partners then conduct a series of experiments to reduce risks and discover the future. Most of these will fail to some extent, but that's OK—an imperfect product will evolve and generate value as it is refined.

Set new rules. New governance guidelines for IT are needed. Just as investment managers view a financial portfolio as a whole, an IT investment board should manage its project portfolio against predefined targets for capital allocation, return and risk. The value of IT investments should be estimated by commitments from business executives to deliver value. Project funding should come in stages—say, \$750,000 at a time—and future funding should be predicated on proving benefits and mitigating risks. Project

stages should be sliced into six-month increments. Your staff should monitor projects from concept to the realization of value.

Know your leadership limits. Count the number of competent project managers in your organization, in and out of IS, and approve projects up to but not beyond that capacity. Require that your direct reports oversee all major projects. Work for adequate staffing so that senior people are available to help business executives think through their hypotheses and approaches.

Lean on your legacy systems. Stop trashing your legacy systems, infrastructure and processes. They're your most valuable non-human assets and will take you further than you think. Dell Computer leveraged its legacy systems on the way to 40 percent per annum growth during the '90s. We all want the latest and greatest for critical projects. But the implementation cost and time spent learning the new systems can be huge.

Tap into project techniques. There are proven methodologies out there that can help you improve project predictability and quality and, if applied correctly, reduce the cycle time of development. Those approaches are geared for today's business conditions and technology. One great source of information is the Carnegie Mellon Software Engineering Institute website, www.sei.cmu.edu.

The Vanguard Group, which spends 40 percent of its operating budget on IT, has said that its most important lesson on how to improve the success rate of IT projects is to take time at the start to think things through. Follow that example, and put your findings in front of your leadership team so that you can start to reverse the cycle of software project failure. **CIO**

Susan H. Cramm, formerly vice president of IT and CIO at Taco Bell and executive vice president and CFO at Chevys, a Taco Bell subsidiary, is president of Value-dance, an executive coaching firm based in San Clemente, Calif. She can be reached at shcramm@aol.com.



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- Successful management practices

FEATURED SPEAKERS

F. WARREN MCFARLAN

Senior Associate Dean
Harvard Business School

JARON LANIER

Lead Scientist
National Tele-immersion Initiative
and Chief Scientist, Eyematic Interfaces

**AND... MEET TODAY'S VALUE PIONEERS—THE WINNERS
OF THE 10TH ANNUAL ENTERPRISE VALUE AWARDS**

Agenda

SUNDAY, JANUARY 27

8:00 AM – 1:30 PM

Partners Golf Tournament

Enjoy a round of golf on the Ventana Canyon Course

3:00 PM – 6:00 PM

Registration

8:00 PM – 9:30 PM

Partners Café Reception

Meet and network with other participants, Award Winners and Retreat Partners in our informal networking lounge.

MONDAY, JANUARY 28

7:30 AM – 8:30 AM

Registration and Breakfast

8:30 AM – 9:00 AM

Opening Remarks and Retreat Welcome

ABBIE LUNDBERG

Editor in Chief, CIO Magazine

What is Value? Lundberg explains how the decisions and deliberations of the Enterprise Value Awards judges reflect a shift in the IT value proposition—and what it means for businesses today.

9:00 AM – 10:30 AM

Retreat Introduction and Welcome Address: The Internet-Transformed Organization

F. WARREN MCFARLAN,

Senior Associate Dean, Director of External Relations, Aibert H. Gordon Professor of Business Administration, Harvard Business School

In the aftermath of the end of the Y2K problem and the dotcom debacle, both CIOs and general managers might be forgiven for thinking that things would be moving at a less hectic pace in the IT world. In fact, exactly the opposite is true as the Internet, intranets and extranets are deeply impacting the operations and competitive positioning of most major corporations. The critical question has become whether to be a fast adopter or a cautious follower. Different firms have followed both strategies, with great success. This work is taking place on a global scale with the impact the same in Dallas as in Hong Kong. The core of this retreat will be built around one of the largest (and explosively growing) credit card providers in the U.S.

10:30 AM – 10:45 AM

Enterprise Value Award Winner Presentation

10:55 AM – 11:25 AM

Mid-Morning Break

11:35 AM – 12:35 PM

Will Computers Become People in 30 Years?

JARON LANIER, *Lead Scientist, National Tele-immersion Initiative, Chief Scientist, Eyematic Interfaces*

We are used to hearing claims that when computers become a million times more powerful in about 30 years, they will become equivalent to humans or greater than humans. In order to examine whether this might be true, we must rethink a range of questions such as: "Why did evolution take so long?" and "Why is contemporary software so unreliable?"

12:35 PM – 12:50 PM

Enterprise Value Award Winner Presentation

12:50 PM – 2:00 PM

Luncheon

2:00 PM – 2:45 PM

Industry Briefings

2:50 PM – 3:35 PM

Industry Briefings

3:45 PM – 4:15 PM

Coffee Break

4:25 PM – 5:10 PM

Special Presentation on Security and Privacy

CIO, in conjunction with the U.S. Department of Commerce's Critical Infrastructure Assurance Office, hosts a special presentation on security and privacy issues.

5:10 PM – 5:40 PM

Global Industry Value-Chain Restructuring

F. WARREN MCFARLAN

Every aspect of the industry value chain is potentially transformed by IT. Inbound logistics, outbound logistics, sales and infrastructure all operate in an entirely different way in this new world. Organizations are rethinking their core competencies to decide what they wish to keep inside the boundaries of the company, and what they choose to delegate to others for execution. This realigning of what lies inside/outside the corporation is one of the deep, IT-enabled transformations of the early 21st century.

5:45 PM – 6:45 PM

Partners Café Reception

Catch up with other participants in our informal lounge, share ideas and experiences.

7:00 PM – Midnight

Partner Hospitality

TUESDAY, JANUARY 29

7:30 AM – 8:30 AM

Breakfast

8:30 AM – 8:45 AM

Corporate IT Spending Trends—Where are They Headed?

GARY BEACH

Group Publisher, CXO Media Inc.

Every month for the past year and a half CIO Magazine, in partnership with Ed Yardeni, chief investment strategist of Deutsche Banc Alex.Brown, has surveyed a panel of senior executives on current and future IT spending and other issues. Beach presents an overview of the latest results and emerging trends from the CIO Tech Poll.

8:45 AM – 9:00 AM

Enterprise Value Award Winner Presentation

9:00 AM – 10:00 AM

E-Commerce Management

F. WARREN MCFARLAN

Even as the world of B2B exchanges has fallen apart, the challenges and economic opportunities implicit in implementing B2B links and B2C links are moving forward rapidly (the bottom line contribution can be enormous). Two very different industries are looked at; one is the world of B2B evolution in the telecommunications industry and the extraordinary new standards of support that have been established; the other captures the major repositioning of various players in the financial services industry. This battle consumes the attention of everyone from the CEO to the CIO in trying to get it right.

10:00 AM – 10:15 AM

Enterprise Value Award Winner Presentation

10:25 AM – 10:55 AM

Mid-Morning Break

11:00 AM – 11:45 AM

Industry Briefings

11:55 AM – 12:10 PM

Enterprise Value Award Winner Presentation

12:10 PM – 12:55 PM

Globalization

F. WARREN MCFARLAN

Almost unimaginably, three years ago, technologies have spread out across the

globe and provided fundamentally new ways of distributing work and linking organizations together. The special challenges posed by certain environments, such as China and India, are dealt with. It is a vastly shrunken global arena that we are dealing with today.

1:00 PM – 3:45 PM

Luncheon and Case Study Workgroups

3:45 PM – 5:45 PM

Informal Networking and Recreation

5:45 PM – 6:45 PM

Enterprise Value Awards Reception

7:00 PM – 9:30 PM

Enterprise Value Awards Dinner and Ceremony

Come raise a glass and toast the winners at our black tie dinner and ceremony, proudly underwritten by Genuity.

9:30 PM – 11:30 PM

Dessert Reception

Hosted by Genuity

Cap off the evening with a special post-awards reception.

WEDNESDAY, JANUARY 30

7:30 AM – 8:30 AM

Breakfast

8:30 AM – 10:30 AM

Case Study Workgroup Presentations and Discussion

10:30 AM – 10:45 AM

Mid-Morning Break

10:45 AM – 11:30 AM

Reflection

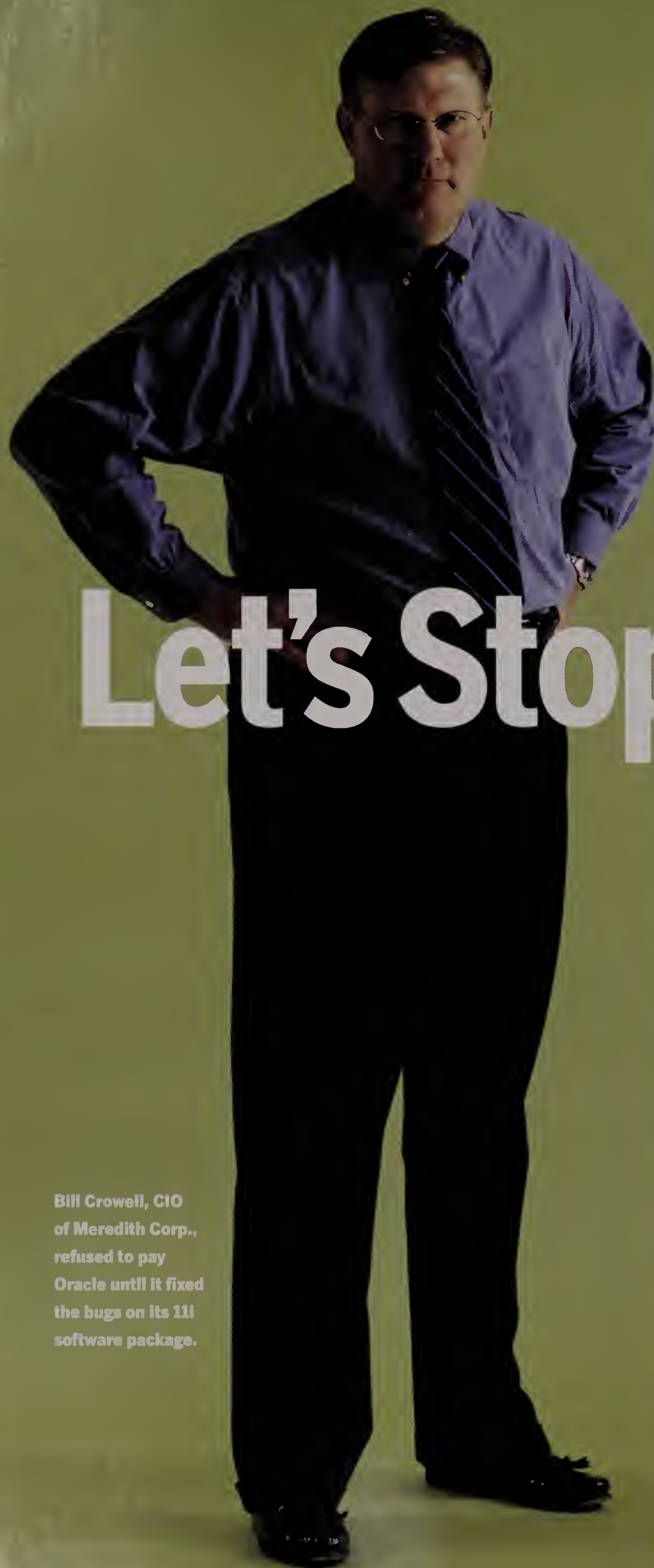
F. WARREN MCFARLAN

The Retreat closes with a discussion of the specific management practices currently in use by leading adapters to the new information age.

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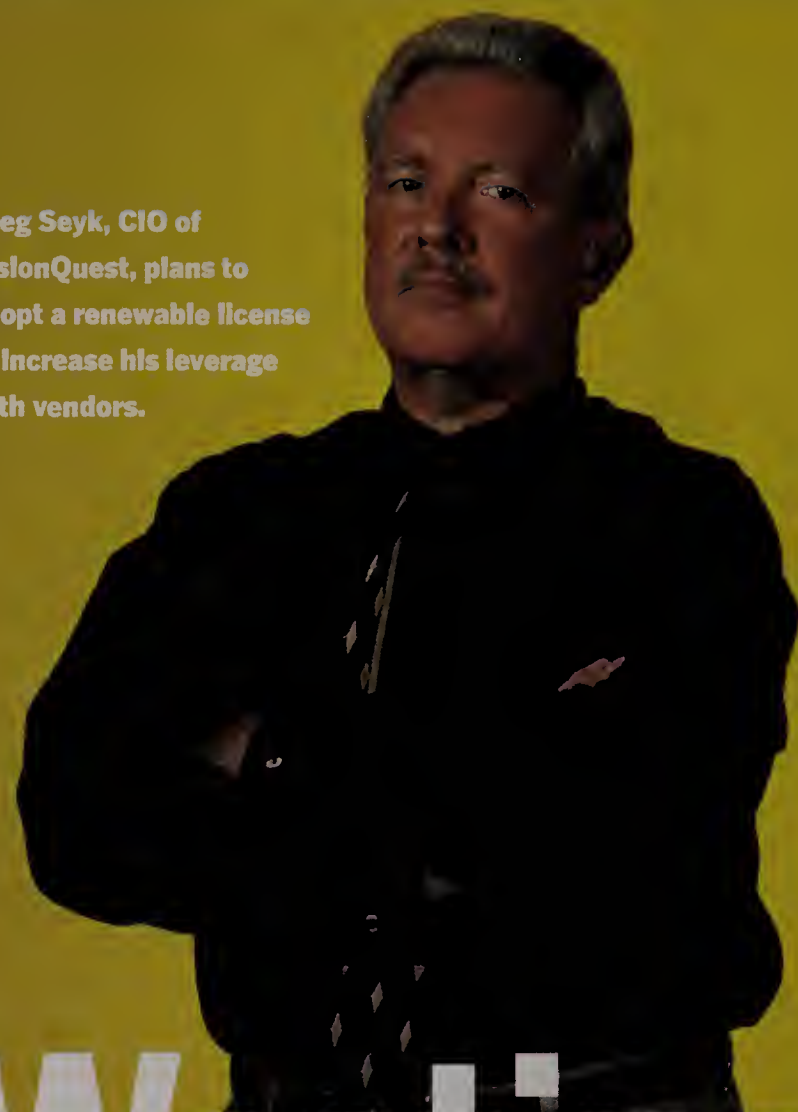
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Bill Crowell, CIO of Meredith Corp., refused to pay Oracle until it fixed the bugs on its 11i software package.

Greg Seyk, CIO of VisionQuest, plans to adopt a renewable license to increase his leverage with vendors.



Raymond Dury, co-CIO of Ameritrade Holding, proposes using open source as a way to improve the quality of software overall.



Let's Stop Wasting

Analysts estimate that American businesses end up spending billions for software that doesn't do what it's supposed to. Some CIOs are tired of playing the sap and are beginning to take action.

BY MERIDITH LEVINSON

\$78 Billion A Year

Greg Seyk, newly appointed CIO of VisionQuest, had only months to rid his

organization of its Y2K bugs. (Y2K, after all, was not a top priority for the Tucson, Ariz.-based national youth services organization, whose mission is to keep kids out of jail, and Seyk had just come on board the previous spring.)

The first thing Seyk did was purchase a Y2K-compliant ERP system—Lawson Insight version 7.1.5—from Lawson Software, a St. Paul, Minn.-based vendor. But just as he and his staff of five got around to testing the software, Lawson released a new version (Lawson Insight version 7.1.6) that included a function for prioritizing bill payments. That function had been promised but never delivered in any of the previous versions, Seyk says.

With just two months to go before the clock struck midnight on Dec. 31, 1999, Seyk didn't have time to deploy the upgrade, even though the payment prioritization function had been a critical selling point for the 53-year-old CIO. "We had to implement accounts payable, the general ledger, payroll and human resources to make sure they were Y2K compliant. It was no small feat," says Seyk, who is also a vice president of the private company.

Between November 1999 and July 2001, Lawson released seven new versions of its software to fix bugs or add functionality that had been promised but absent in each previous version. Seyk was outraged. He documented his problems in a series of letters to Lawson executives, met with them on two occasions, and sank a total of \$594,974 into software and maintenance to correct the flaws in their products.

And then it dawned on Seyk why the software and support were so bad: That's the way vendors make money. They push products on the market before they've been adequately tested,

Reader ROI

- ▶ Understand the underlying economic causes for bad software
- ▶ Learn how you can put pressure on vendors to improve the quality of software
- ▶ Discover why a wholesale change in the economics of the software industry may be the best approach

demand payment up front and then are often not available to deal with the sequelae of poorly performing products. (Lawson officials declined to comment specifically on VisionQuest's problems with its software. All a Lawson spokesperson would say is that the company is working with VisionQuest in an effort to resolve its concerns. "We are committed to 100 percent customer satisfaction," says Bev Bergstrom, vice president of communications for Lawson.)

HOW BAD SOFTWARE PAYS DIVIDENDS

CIOs have been complaining about poorly designed and buggy software forever. In a recent survey on CIO.com, almost half of the 88 IT professionals questioned said they were unsatisfied with both the quality of their business software and the support. (For full survey results, see www.cio.com/printlinks.) The problem is a big one: Faulty software costs businesses \$78 billion per year, according to Jim Johnson, chairman of The Standish Group, a research company based in West Yarmouth, Mass.

But now many CIOs are beginning to realize that the root of the problem may lie in the economics of the industry. Vendors generate most of their revenues through perpetual licensing agreements, which force CIOs to pay up front for an application. In return, CIOs own the software and the right to use it "in perpetuity." The problem with this model is that in reality, CIOs are lucky if they

can get three years out of a product before vendors release entirely new versions of their software. Vendors further pressure CIOs to buy those new releases by threatening to stop supporting previous releases—a tactic they often take both to cut their tech support costs and to get CIOs to pay again and again for what is essentially the same product.

Another problem with the perpetual model is that CIOs have to fork over an additional 15 percent to 20 percent of what they paid for the software in annual maintenance fees to cover product updates and tech support, according to Chuck Phillips, managing director and software industry analyst at Morgan Stanley Dean Witter. If CIOs want to receive upgrades, patches and access to tech support—as inadequate as it can sometimes be—they have to pay the yearly maintenance fee. Software companies earn a significant amount of cash from these fees. So it's in the manufacturer's best interest, at least financially, to make products that need maintenance and that have to be continually improved with successive updates, patches and versions that CIOs pay for up front. In sum, bad software works for the vendors.

There are, of course, other reasons for all the bugs. IT professionals point to a whole litany of causes: bloatware, with all its useless bells and whistles; programmers working in isolation, blissfully ignorant of how people will ultimately be using their software on a daily basis; reusable components that may already contain bugs; an absence of agreed upon professional stan-

dards; and developers who take shortcuts to meet deadlines during development.

But a large part of the story may indeed be the way vendors sell software. CIOs are finally waking up to this, and a growing number are demanding that vendors change their business models. A council of IT leaders from a dozen heavy-hitter enterprises convened in August under the auspices of Boston-based analyst company AMR Research, intent on pushing for software industry reform. The group issued a peaceful statement of its desire to "work with" software companies for improvements in quality, delivery reliability and versioning. However, with big names like Becton Dickinson, Boeing, Cabot, General Dynamics and Kraft on the roster, the council has enough weight to change "work with" to "lean on."

Some other IT users have resorted to more extreme measures—such as withholding payments to put pressure on vendors—but new legislation may soon make it harder for CIOs to employ such brute financial tactics. The uniform computer information transactions act (UCITA) makes it harder for customers to sue vendors and allows vendors to more easily change contract terms. The UCITA has already been passed in Virginia and Maryland and is under consideration in seven other states and the District of Columbia.

Fortunately, there are a host of alternative solutions on the horizon, and a growing number of CIOs are determined to make them a reality. They include renewable licens-



"We didn't pay Oracle. We owed maintenance of \$300,000 to \$400,000, and we just didn't pay it. We said, 'We're holding on to the money until you get this thing up and running.'"

—BILL CROWELL, CIO, MEREDITH CORP.

PHOTO BY DOUG HETHERINGTON



“If CIOs could say, ‘You’ll get 10 percent now and 10 percent after each quarter if the software works, it would give vendors a financial incentive to make sure the product works.’”

—GREG SEYK, CIO, VISIONQUEST

ing agreements, in which CIOs purchase the right to use software for two to three years at about 85 percent of the cost of what they’d pay under a perpetual license. CIOs then have the option to renew the license at the end of the term if they’re happy with the quality of the product and the support. Subscription licensing agreements are similar to renewable licenses, except the term is shorter, lasting about a year, and CIOs rent the software, as opposed to owning it.

Finally, some CIOs are opting to circumnavigate packaged software wherever possible. They’re turning to open-source technologies such as the GNU and Linux operating systems, the Apache Web server and Sendmail e-mail. “People are not involved with [the open-source movement] for profit; they’re involved with it because they want to write good product,” says Bill Lessard, coauthor of *NetSlaves: True Tales of Working the Web* and a former developer for Prodigy and AOL Time Warner. “If software makers see they are losing money to people going the open-source route, then they will change. Until then, it will be business as usual despite appearances.”

As much as eight years ago, Patricia Wallington, president of CIO Associates and former CIO of Xerox, was envisioning a new method of buying software. “I wanted it to be like a lending library where you could find modules on the Web, buy the ones you were interested in, cobble them together and create your own software,” she says. “We need to rethink the way we deliver software because it is so intransigent.”

WITHHOLDING PAYMENT: THE BRUTE FORCE OPTION

The economics underlying the software industry—its emphasis on quarterly earnings to impress investors—leads to the pursuit of short-term profits, often at the expense of long-term gains. And this tendency has only been exacerbated by the current market downturn. The revenue of software vendors is predicated on acquiring new customers. That initial sale provides software vendors with their biggest profit. So there is a built-in incentive for vendors to rush a new release of software out the door before it is completely tested and debugged.

Bill Crowell, CIO of Meredith Corp., the \$1.1 billion publisher of *Better Homes and Gardens*, believes it is just this profit motivation that has caused many of the troubles he and other CIOs have had while implementing Oracle 11i. He had purchased Oracle 10.7SC, a client/server-based financial system that handled accounts payable, the general ledger and purchasing functions from the vendor in the spring of 1999, with the assumption that it would be good for at least four years. But in the fall of 2000, Oracle released a new Web-based version, Oracle 11i, and told its customers, including Crowell, that it would be dropping support for all previous releases. Crowell had no choice but to upgrade. (Under pressure from customers, Oracle has repeatedly rolled back the end-support date of these earlier versions. And recently, Oracle offi-

cials say they would not immediately be dropping support for older versions.)

Oracle also promised that 11i would include a feature that would automatically enter electronic records of all the purchases Meredith employees had made using their corporate credit cards into the accounts payable or general ledger system either monthly, weekly or daily depending on how the company configured it. Crowell says that when he purchased 11i, the promised functionality was absent. “It wasn’t until about a year later when 11i actually had that capability,” he says. It was an inauspicious beginning.

As soon as he began the upgrade, Crowell found bugs running rampant in the software, like ants scuttling over a piece of fruit. Files were corrupted. Data was lost. Processes didn’t work. Screens froze. “It was just a nightmare,” says Crowell. “We were getting literally dozens of developer patches to this software. Then we were getting patches for patches. The quality was just atrocious.”

One of the biggest bugs bit the interfaces between application components in the financial system. The system didn’t transfer data between accounts payable and the general ledger, between purchasing and accounts payable and between purchasing and fixed assets, Crowell says. The failures were bad enough that had Crowell and his team not been running 11i in a test environment, Meredith would have had to shut down its financial system. It would not have been able to do its accounting or pay its bills until the problems were solved. (Oracle officials declined to comment on either the bugs

in 11i or on Meredith's specific problems with the software.)

"It was clear [Oracle] never tested the interfaces because they flat-out failed the first time. We felt that what was [supposed to be] their general release software was effectively beta," says Crowell. "There's no question that they were under pressure from management to be first with a Web-enabled version of their software."

The 11i implementation was supposed to go live by April 15, but the bugs delayed the implementation by just one month, but only because Crowell's staff worked 24/7 for four months. The CIO estimates that the bugs cost his company more than \$100,000; he had to pay for contractors to help with the nine-month implementation, and he wasn't able to put staff on other pressing projects.

So how did he muddle through this debacle with Oracle? "We didn't pay them, for one. We owed maintenance of \$300,000 to \$400,000, and we just didn't pay it. We said, 'We're holding on to it until you get this thing up and running,'" Crowell says.

But he thinks it wasn't so much the money that got Oracle to fix the bugs in 11i as it was the brute force he and his project leaders applied in dealing with the vendor. They called Oracle daily to see if the company was making headway resolving their problems. They also forced Oracle to give them contacts in the development group so that they could ask developers directly for help rather than going through the support team.

Crowell blames economic forces for the

cio.com

To learn more about this topic, read **"BUGGY SOFTWARE"** and **"AGILE PROGRAMMING"** at www.cio.com/printlinks.

problems with Oracle 11i. "They're trying to move so fast to get the product into the marketplace that they're not adequately testing and debugging their software," he says. If Oracle had waited six months before releasing 11i and taken that time to test the application, he says, the upgrade would have gone off without a hitch. "Overall we're very pleased with the new application, but if Oracle thinks they're the Lexus of the software industry, [after] what they've done to their customers, you feel you've bought a Dodge De Soto," Crowell concludes.

RENEWABLE SUBSCRIPTIONS: USE NOW, PAY LATER

Crowell believes that the new renewable and subscription arrangements that are becoming more prevalent in the software world would have ameliorated the problems he ran into while deploying 11i. Under a subscription model, in which he would have paid less up front, Crowell would have had more leverage. Also, it would have given Oracle a greater financial incentive to please Crowell. In fact, Crowell plans to start buying software from Microsoft on a subscription basis in two years, once he finishes

receiving all the upgrades he paid for two years ago. To him, the renewable model makes sense. It's the way his own publishing industry works. "It's a subscription. We know when the revenue is coming in. We can plan our business around it," he says. "And we deliver a quality product every month. The [vendors] need to think about delivering quality every month and a business model that allows them to do that."

Microsoft, in fact, announced that it would begin offering a brand-new subscription license this month for its operating systems and software, including Microsoft Windows Professional and Microsoft Office Professional. The Enterprise Agreement Subscription, as the new license is called, is a major departure from the perpetual model. CIOs will now lease the software under subscription licenses. While CIOs see the potential benefits of the subscription model, many are uncomfortable with the specific terms Microsoft is offering. For instance, Microsoft is requiring that customers pay a hefty annual fee even before new upgrades are released.

Microsoft has also introduced a new and more controversial twist to its perpetual Open and Select licensing agreements. These programs pressure CIOs to upgrade to new versions such as Windows XP by Feb. 1, 2002, at a discounted rate. If they don't, they will have to pay twice as much to upgrade after that date. (For more information on this controversy, go to "Looks Can Be Deceiving" on www.cio.com/printlinks.)

Mark Grove, CIO of AmericasDoctor, a pharmaceutical services company based in



"Those folks involved in the open-source movement are very knowledgeable at what they do, and they're producing really great code."

—RAYMOND DURY, Co-CIO OF AMERITRADE

PHOTO BY MARK VAN S.

Chicago, says software vendors that require perpetual licenses with constant upgrades are not serving their customers. "Any vendor who's doing that is trying to force the customer to follow the vendor's business model," Grove says. "When they tell a customer that he has to upgrade at a certain time, they're forgetting that their customers have their own business cycles and busy seasons that they have to work within."

After his experience with Lawson, VisionQuest's Seyk is also considering buying software from vendors on a renewable or subscription basis when it is offered. He likes the idea of not paying for the software entirely up front. "Once you give [vendors] the cash and the software doesn't perform, you have no leverage," he says. "If [CIOs] could say, Sure, you'll get 10 percent now and 10 percent after each quarter, and a year from now you'll get it all if [the software] works," that would be a way to hold the vendor accountable. "It gives [the vendor] a financial incentive to make sure the product works," he adds.

OPEN SOURCE, OPEN SESAME

Some CIOs believe open source could liberate businesses from their dependence on the dysfunctional software-making machine. Linux now boasts important implementations at companies including Shell Oil, hotel franchiser Cendant, networking giant Cisco and retailer Burlington Coat Factory, while the Apache program is by many accounts the most widely used Web server software today. The prevalence of these open-source packages will only continue to grow, with big IT vendors such as IBM providing hardware with Linux and Apache bundled in.

Raymond Dury, co-CIO of Ameritrade Holding, says open-source software, because of its community-style development method, has flexibility that commercial software lacks. The packaged software market doesn't offer the solutions he needs to support his company's thousands of daily online transactions. To enable customers to make trades faster,

An Action Plan for CIOs

Here are some steps you can take to get better software and service and at the same time pressure the industry to reform its practices

- **Refuse to pay in full for a license up front.** Instead, negotiate a contract with your vendor that allows you to pay a percent of the total cost up front and then the remainder six months to a year later if the product and service is acceptable.
- **Adopt open-source technologies.** Open source provides CIOs with the flexibility to custom-build applications under their own quality control.
- **Seek out vendors that offer renewable and subscription licenses.**
- **If you're having continual problems with an application, go directly to the developer rather than to the tech support staff or salesperson.** The person who has worked on the application may have some pride of ownership.
- **Network with your vendor's other customers to find out if they too are experiencing problems with the software.** If so, band together and plan a tag-team meeting with the vendor. There really is strength in numbers.
- **If all else fails, take your vendor to court.**

—M.L.

hold more trades in their portfolio and get real-time quotes, for example, Ameritrade's website needs enormously robust software code—code that can support tens of thousands of simultaneous connections with sub-second responses.

Instead of buying software and additional hardware to extend the speed and computing power of his website, Dury is looking to configure his own software using open-source code to support all of those transactions.

He also wants to replace three separate software components that communicate back and forth when a customer wants to execute a trade with one piece of proprietary software built using open-source code to consolidate these functions. "We have separate pieces of software communicating with each other, trying to do one process," Dury says. "Instead we could use a piece of open source to consolidate these separate functions under one piece of software."

Dury has long been a fan of open source. He used it to develop a secure e-mail application while serving as the vice president of operations at Netdox, a Deloitte and Touche venture in 1997. "Those folks [involved in the open-source movement] are very knowledgeable, very good at what they do, and they're

producing really great code," says Dury.

Open source would give CIOs the flexibility to build exactly what they need, he says. However, many are skeptical about using it because the technology is immature, and it's hard to find programmers who know how to write the code and maintain it. When you buy software from a vendor, you can always turn to its help desk, however incompetent. With open source, you're on your own.

Dury acknowledges that open source requires seasoned in-house IT staffs—who know how to build and integrate their own systems—and that not all companies can afford to hire this kind of talent. But he likes open source for the same reason that Crowell and Seyk like the renewable options to perpetual licensing agreements. "If you increase competition [in the market] because there's quality in open-source software and because it's low cost, some folks will move toward it," Dury says. "As a result, vendors are probably going to have to increase their quality and reduce their costs." **CIO**

What do you think will improve the quality of packaged software and the practices of software vendors? E-mail Senior Writer Meridith Levinson at mlevinson@cio.com.

E-mail management is principally a people issue, not a technical one

How to Tame the E-Mail Beast

BY LAUREN GIBBONS PAUL

“We tell our employees not to open unknown attachments,” says Tim Naramore. “But they do it anyway.”

Reader ROI

- ▶ Reasons why your corporate e-mail policy might be the most important document in your HR arsenal
- ▶ The latest tips on avoiding viruses and spam
- ▶ Strategies for managing volume and storage

Naramore is CIO of Allegiance Telecom, a competitive local exchange carrier in Dallas. In fact, Allegiance has a relatively stringent approach to enforcing its corporate e-mail usage policy—employees must agree to the policy’s terms and conditions each and every time they log on to the e-mail system. The policy includes a prominent directive: Don’t open unexpected attachments. But that wasn’t enough to stop several of the \$285 million company’s employees from opening the attachment with the Love Bug

virus in May 2000. The virus slipped through Allegiance’s virus-defense systems. Fortunately, an alert network administrator noted the virus-prompted surge of messages and froze all incoming mail, allowing the company to contain the virus within an hour.

Naramore’s company got only a superficial bite from the Love Bug (which cost U.S. businesses an estimated total of \$10 billion), but viruses are just the beginning of a laundry list of woes that accompany the blessings of e-mail communication. The popularity of

PHOTO BY DAN BRYANT



**Allegiance Telecom CIO
Tim Naramore monitors
employees' messages
only when there's a job
performance issue.**



Tolerating e-mail policy
violations can
get your company
into legal *hot water*.

—JOE FELIU, CIO AND VICE PRESIDENT
OF OPERATIONS, VISTO

e-mail creates bandwidth challenges—Allegiance's system traffic, for example, jumped from 200,000 messages per month last year to 500,000 per month this year. Archiving those missives creates storage issues. And mixed in with all the business-related e-mail is the usual flood of spam,

scams, dancing animated babies, sexist jokes and even pornographic images. Some companies have discovered the hard way that those messages are financial, ethical and legal land mines. Chevron, for example, paid \$2.2 million to settle a suit brought by a female employee protesting an e-mail circu-

lated in the company that listed 25 reasons why beer is better than a woman.

"It's absolutely astonishing, the things people will put in e-mail," says Joe Feliu, CIO and vice president of operations for Mountain View, Calif.-based Visto, a software and services vendor for remote access to messaging systems.

E-mail is a seemingly mundane issue but one that demands careful attention from the CIO. The key realization is that e-mail management is principally about people management. In this article, CIOs share their tips for keeping e-mail under control.

Ten Tips for Taming the Beast

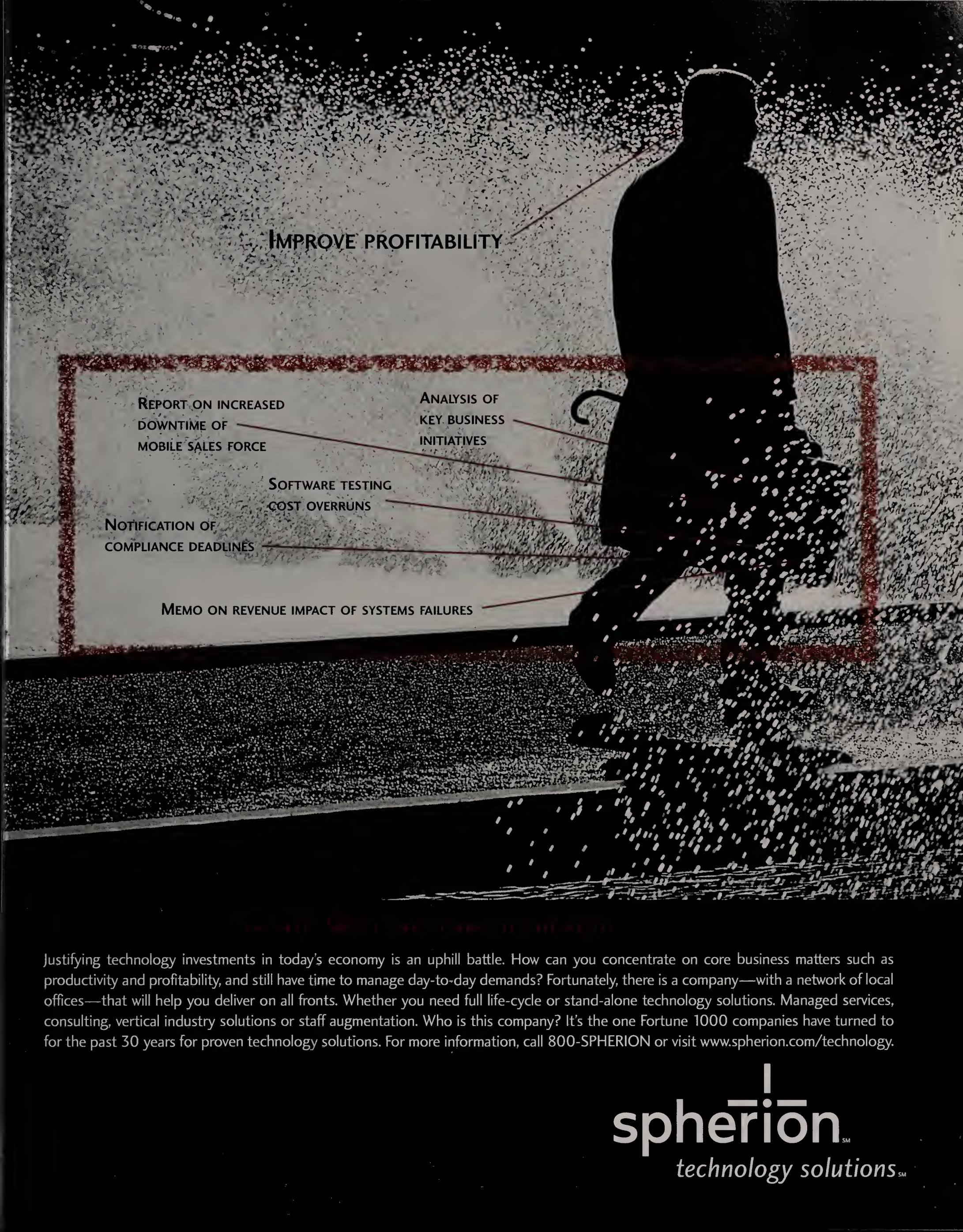
1. Create a reasonable and enforceable policy.
2. Spell out privacy expectations clearly.
3. Require that each employee sign the policy. Issue frequent policy reminders.
4. When the policy is broken, consult the legal department and have an immediate conversation with the employee, accompanied by a human resources representative.
5. Don't limit employee training to policy issues. Also include etiquette, proper use of group mailing lists, and information about recognizing scams and urban legends.
6. Limit employee mailboxes to an appropriate size (CIOs interviewed for this article recommended a range from 15MB to 150MB depending on the type of work).
7. Consider your potential legal liability in determining how long to store messages.
8. Consider filtering tools, but be aware of the limitations.
9. Install two different antivirus software packages (one for servers, one for desktops).
10. Teach users to distrust all attachments, particularly unexpected ones. —L.G.P.

Start with the Policy

Your first line of defense against e-mail troubles is a solid e-mail usage policy, regularly communicated and consistently enforced. Unfortunately, no single e-mail policy works for all companies.

Each CIO must sort through corporate culture and arrive at a policy that is within bounds and workable. The undertaking is usually done in conjunction with the general counsel (or other legal adviser) and the human resources department. (For sample policies, go to www.cio.com/printlinks.) Once it is set, the e-mail usage policy should become part of the company's HR policies, right there in the employee handbook for all to see.

At Paul, Hastings, Janofsky & Walker, a law firm headquartered in Los Angeles with more than 1,900 employees, staffers must



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sign a technology usage agreement upon joining the firm. CIO Mary Odson also circulates an update or review of the agreement every six months.

The cornerstone of the e-mail usage policy is the definition of proper e-mail use. By now it should be clear that employees in the United States do not have an expectation of privacy in their company e-mail accounts (though it does not hurt to spell that out prominently in the policy). The question that remains is whether employees may use the e-mail system to send personal messages. Allegiance Telecom's policy is restrictive: Employees must confine their e-mail to business purposes only. "They should not e-mail their mother," Naramore says. He adds that IT staff do not police employees' e-mail messages unless they see a vast increase in messages or other curious activity. "This doesn't come up unless there's a productivity issue," he says.



Employees need ongoing training on how to *use e-mail efficiently.*

—MARY ODSON, CIO OF PAUL, HASTINGS, JANOFSKY & WALKER

Other companies are more lenient. "They're welcome to e-mail or surf the Web during lunch or while taking a break," says Mike Foster, CEO of Foster Institute, a technology training company in Dallas. Still others do not restrict their employees' e-mail or Internet usage, believing that free use is a perk to be enjoyed by all salaried employees in good standing who get their work done.

Ray Everett-Church, senior privacy strategist for consultancy ePrivacy Group in Malvern, Pa., believes that the most restrictive policies treat employees as children, leading to poor morale, low productivity and an atmosphere of distrust. As a privacy advocate, he strongly advises CIOs not to have a policy of reading employees' e-mail. On the other hand, he says employees should be notified that the network is a company resource and that particular practices

(such as downloading MP3 files or sending messages with sexual or discriminatory content) are forbidden. "Reserve the right to access e-mail, but at the same time make it clear the employees are valued and trusted," Everett-Church says.

Executives interviewed for this article echo a key fact of life: Policy violations will still happen. The best usage policy in the world will not prevent all misuse. After all, as Foster says, "If it weren't for people, this stuff would be easy." When a breach has occurred—and they will happen—the most important thing you can do is take action. Whether the offense involved defamation, sexual harassment or disclosure of corporate secrets, you must consult with legal counsel and then meet with the offender. Don't get into the meeting without a rep from HR.

"You must confront the employee and

deal with it," says Feliu, who once ran the e-mail system for the United States Postal Service's 200,000 employees in the northeastern United States. If it's a first offense and the person shows remorse, a warning might be enough. If the actions continue after that, dismissal may be necessary. Failing to deal with the issue head-on could ultimately be construed as the corporation tolerating the behavior—and *that* could mean big bucks in court in addition to workplace disruption.

Training, Training and More Training

training employees on e-mail policies is standard procedure for many companies, but training that stops there is inadequate. Employees also need instruction in e-mail etiquette, including how to recognize spam, scams and urban legends.

A common occurrence: One person sends out a message to everyone in the corporate address book offering free Dodgers tickets—and then someone replies to everyone on the list. Odson has seen this carried to absurd


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E-Mail Management

lengths. "Someone will send a message to the network, 'Don't open this file.' Then someone replies to the whole group, 'You're right, don't open that file.' I have seen it get to that point." Odson recommends that employees "BCC" the recipients when sending messages to the whole company. That way, recipients cannot reply back to the entire group.

Some of the most commonly forwarded e-mails are hoaxes. Employees sometimes flood corporate networks with forwarded messages in an effort to help sick children or win free vacations, despite the fact that the majority of those messages are already well-

At Allegiance Telecom, Naramore stores 90 days' worth of e-mail for roughly 4,000 employees, which eats up 400 gigabytes of storage space. If your company is a startup or is relatively small, you might not have felt the need yet to limit the size of employee mailboxes—but you will. Most midsize and large companies limit individual inboxes to sizes between 15MB and a generous 150MB. A more radical possibility: cutting off employee access to some or (in extreme cases) all e-mail distribution lists. "You start out with no constraints, but they soon become necessary. Do you really want someone to be able to post software practice reminders

to the whole company?" asks Felu.

One trick that can help reduce the sheer volume of messages is to help employees balance between "push" and "pull" style communication. E-mail is a push mechanism—it goes out to everyone on the list, even those who might not be interested. Some information is better posted on the corporate intranet—as it would be with an old-fashioned physical bulletin board—where concerned employees can pull the information on an as-needed basis.

Most companies store e-mail messages on a central server, back them up on tape and save them for a certain amount of time.

Allegiance Telecom retains its employees' e-mail messages for 90 days as a matter of policy. "We looked at the business needs and weighed those against storage costs," Naramore says. From the disaster-recovery standpoint, Naramore recommends using a mail server such as iPlanet that allows you to recover mailbox-by-mailbox.

At R.R. Donnelley & Sons, more
than **7 million messages** flow through
the system each month.

—GARY SUTULA, SENIOR VICE PRESIDENT AND CIO

known urban legends. Directing employees to check such missives against a reputable site such as www.scambusters.com can help reduce such distractions.

At Odson's firm, every new hire undergoes a half day of training devoted to e-mail. The managers can't get enough e-mail training for their direct reports, Odson says, because they have seen the bloodbaths that can result from inappropriate use of e-mail.

Controlling the Flood

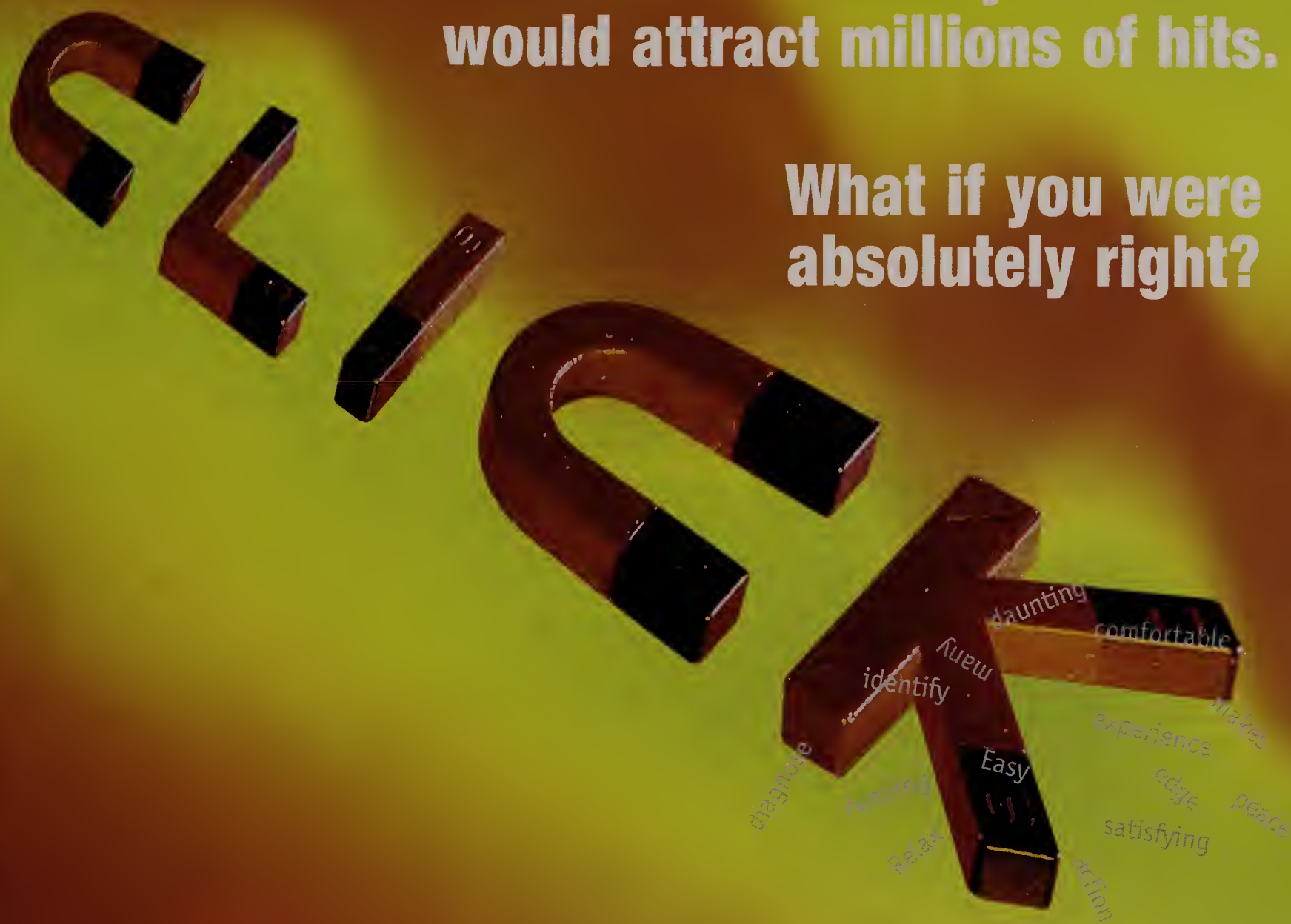
e-mail usage just keeps going up. At big companies, the sheer volume of daily messaging can become daunting. At \$5.8 billion printing giant R.R. Donnelley & Sons, for example, more than 7 million messages flow through the system each month, according to Gary Sutula, senior vice president and CIO. And even at smaller companies, CIOs must consider not only the cost of network usage and physical storage created by the messaging flood but also some possible legal ramifications surrounding stored e-mail.



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His e-mail system currently uses Microsoft Exchange, which does not have that capability. The one time he had to recover e-mail from the backup (because of a corrupt mail store), it took 18 hours, an "unacceptable" amount of time.

How long you retain e-mail depends on what your business needs the information for, but there is another significant aspect in storage decisions: legal implications. The longer you store e-mail, the longer it may be subpoenaed by a court. If you back up messages forever, adding and adding to the mail archives or deleting only when you run out of room, you will be responsible for handing over all the stored messages in the case of litigation.

The problem here—beyond the hassle of producing all the e-mail—is that e-mail more often yields incriminating rather than exculpatory evidence. (The damning e-mail messages brought to light in the Microsoft antitrust trial are just such an example.) "E-mail preserves bad things more often than good things," Everett-Church says. "My advice is to keep as little information as possible for your business needs." You might reasonably retain messages for a month to three months. Much more than that and you'll face increasing storage costs—not to mention greater legal risk.

Tools that Can Help

While people and policy issues are paramount, the good news is that software tools offer some help in managing e-mail. Filtering is the de rigueur way to avoid a lot of the spam and viruses floating around in cyberspace. Tools such as MineSweeper and Brightmail filter out the executable file attachments that often contain viruses as well as potential spam, both by objectionable content (for example, "Work at home!") and by segregating messages from known "spam houses." Feliu of Visto uses Brightmail but prefers to err on the generous side: He filters known spam content into a specific folder

where employees can view it if they have some reason to do so (such as if they are looking for a lost message). Says Feliu, "One person's spam is another person's gold."

Providian Financial uses Lotus Notes as its e-mail platform (as does R.R. Donnelley) for its 7,000 employees who have corporate e-mail accounts. CIO Tanni Graichen believes that choice has helped her escape the majority of computer viruses, as hackers target mostly Microsoft-based systems.

Don't expect legislation
barring spam to be
passed into law
any time soon.

"Most of the viruses so far have been geared toward systems with directory structures such as Microsoft Exchange. Lotus Notes seems much more protected," she says.

Providian's e-mail servers handle between 120,000 and 150,000 internal messages on the average day, plus another 39,000 messages that come through the Internet. Graichen and her e-mail deputy, D'Arcy Tomlinson, have been able to reduce outside traffic significantly by using more than 30 spam filters.

Despite the fact that spam bedevils almost everyone in corporate America today, don't expect legislation (such as the current Unsolicited Commercial Electronic Mail Act of 2001, H.R. 95) barring it to be passed into law any time soon. The reasons for that are complex. Although every U.S. company (indeed every man, woman and child with an e-mail account) must spend precious time and computing resources dealing with these unwanted messages, spam is not exactly top-of-mind.

According to Everett-Church, who is a member of the Coalition Against Unsolicited Commercial E-Mail, anti-spam activists are sorely out-funded by the pro-spam lobby,

which includes large financial-services companies and the Direct Marketing Association. Even though an estimated 30 percent of the 30 million messages coming through the AOL network every day are spam, AOL Time Warner is not backing anti-spam legislation because it wants to reserve the right to send its own commercial messages, according to Everett-Church. Most of the other large ISPs feel the same, he says.

Everett-Church points out that it costs next to nothing to set up shop online, justifying the estimated positive spam response rate of well under 1 percent. "All the spammer needs is one or two hit rates per spam run and he'll be happy. Sadly, there are at least one or two idiots per million people."

Executives of public companies don't like to talk about spam, he says, because they don't want the world to know just how much it costs them. "When part of your IT budget depends on whether Billy Bob in accounting signed up for a pyramid scheme, that's not something they like to talk about," Everett-Church says. "With spam, it's an ongoing guerilla war."

Viruses can also be curtailed by filtering out .exe and .vbs file attachments, and using two different antivirus software packages on the server and the desktop. That's Naramore's approach. He uses Norton Anti-Virus on the desktop and Fsecure on the

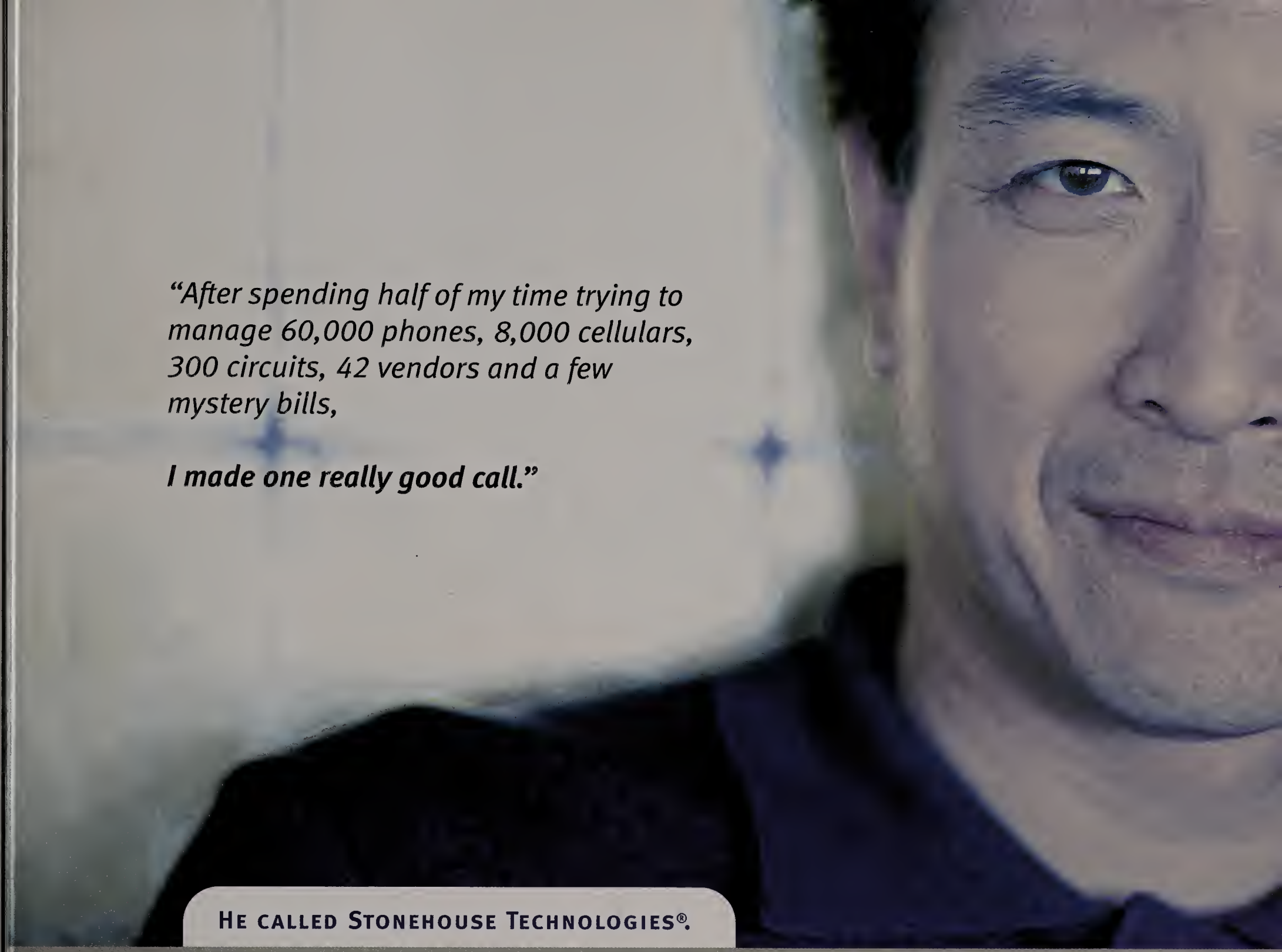
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server. However, teaching users to distrust all attachments remains a best practice.

Naramore knows it's just a matter of time before the next incident crops up. "You train them, then it happens again. Luckily we haven't had any downtime from this stuff." 

Lauren Gibbons Paul (lauren paul@mediaone.net) is a freelance writer based in Waban, Mass.



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Nobody to Play With

The VP of IT at the Goldman Industrial Group of Vermont thought his suppliers would jump at the chance to collaborate electronically. Two years and millions of dollars later, he's still waiting for a partner.

BY BEN WORTHEN

JACK LOWRY has a dream: a manufacturing company where integrated, enterprisewide information systems reduce costs, cut cycle times and allow different companies to collaborate on product design and production. Lowry imagines a level of collaboration that goes well beyond the simple sharing of blueprints and computer-aided design (CAD) files; he dreams of linking ERP, product data management and whatever other systems contain critical manufacturing data, thereby granting collaborators real-time access to everything from inventory to financials to last-minute product changes.

For several years, Lowry dabbled in integration projects at General Machinery, a division of Wheaton Industries in Millville, N.J., and Vineland, N.J.-based Wallace and Tiernan. And while integrating CAD, ERP and product data management (PDM) systems certainly presented challenges, no one project fulfilled Lowry's vision of using IT to facilitate collaboration with other companies on the grand scale. But in January 1999, Mark Swift, group president of the privately held Goldman Industrial Group of Vermont, a consortium of four machine tool manufacturers that make grinders, gear shapers and cutters for the automobile industry, invited Lowry to come aboard as vice president of IT. Swift promised Lowry that he could make the Springfield, Vt.-based company a testing ground for his collaborative vision.

Lowry spent the next two years laying the very real technical groundwork for his dream of a fully collaborative computing environment. And, indeed, Goldman is now ready to collaborate on a grand scale.

But its partners and suppliers in the automotive supply chain are not.

When Lowry joined Goldman, the company hadn't made a significant IT investment in 25 years, placing him in the enviable position of heading up IT at a company without legacy systems while working for a chief exec-

Reader ROI

- Learn why one company's adoption of collaboration technology hasn't gained it any partners and what the company's CIO is doing to change that



**Before Goldman's VP of IT
Jack Lowry can get anyone to
collaborate, he needs to
educate potential partners.**



A Long History in Vermont

THE GOLDMAN INDUSTRIAL GROUP (above) is a Boston-based holding company comprising six machine tool manufacturing companies and a chemical manufacturer.

In Springfield, Vt., Mark Swift is group president and Jack Lowry is vice president of IT for four Goldman companies—Bryant Grinder, Fellows, J&L Metrology and Jones & Lamson. In 1888, Jones & Lamson set up shop in Springfield followed by Fellows in 1896, Bryant Grinder in 1909 and J&L Metrology in 1919.

The companies fit snugly near the bottom of the automotive supply chain. Tier one and tier two automotive manufacturers—the companies that make major components for the big automakers—buy Goldman's machines and use them to shape, grind and cut pieces for transmissions and other under-the-hood parts.

One could describe Goldman's fortune as slumping if it hadn't been that way for nearly 30 years. The four Vermont companies have a combined workforce of 300, down from 15,000 employees in the early '70s. In Springfield, the landscape offers reminders of Goldman's past prowess. Visitors pass several abandoned Fellows and Bryant Grinder buildings on their way to the companies' headquarters. —B.W.

utive who wanted the best—and was willing to pay for it. Lowry viewed the lack of modern IT (Goldman had only a homegrown order placement and inventory system connected to dumb terminals) as an opportunity. He set out not just to integrate the Goldman companies but to link Goldman's internal systems with current and potential customers and suppliers in the automotive supply chain.

Lowry's new IT infrastructure, which became operational in April, has three major components: a T1 line connecting a network of new PCs on every desk and new workstations on the plant floor; engineering applications, including IBM's Catia CAD and SmarTeam's PDM systems; and a Baan ERP system linked to an e-commerce-enabled website on an NT server. Everything is integrated and runs on the AS/400 platform,

allowing anyone on the network to track a product through order placement, design, manufacturing and shipping. The technology upgrade, excluding training and education expenses, cost \$4 million, a significant outlay for a company with just \$100 million in revenues in a good year.

The new technology was selected and installed with collaboration in mind, a win-win proposition in Lowry's view. For example, instead of Goldman waiting for an out-of-stock part to complete a custom gear cutter, a supplier with a view into Goldman's inventory and order processing systems can recommend a substitute part. The supplier can expedite delivery of the part to Goldman, which is a win for the supplier. Goldman in turn can expedite production and delivery, another win. In this scenario, Lowry thinks Goldman's average cycle time for manufacturing could be reduced from three months to three weeks.

At least that's the promise that dangles in front of Lowry like fruit on a 12-foot-high branch. The reward is in sight, but he can't

reach it without a willing partner. For the past several months, Goldman's salespeople have been pounding the pavement looking to sign up a partner. Lowry himself has been involved in many of these discussions, and he's surprised they haven't lead to anything concrete. Ironically, it was the demands of these same customers and partners that convinced him that the time was finally right for collaborative technology.

"I heard so much noise from the big companies—our customers—saying we need to be able to collaborate," Lowry says. Specifically, customers clamored for collaboration to trim cycle times and squeeze costs.

FEARS AND EXCUSES

Jack Maynard, research director for collaborative business solutions at Boston-based Aberdeen Group, thinks that widespread adoption of collaboration technology involving linked systems and shared data is at least two years away. Furthermore, Maynard believes it will happen gradually, with companies first linking de-sign systems. If those links prove successful, then integrating CRM, ERP and PDM applications will follow.

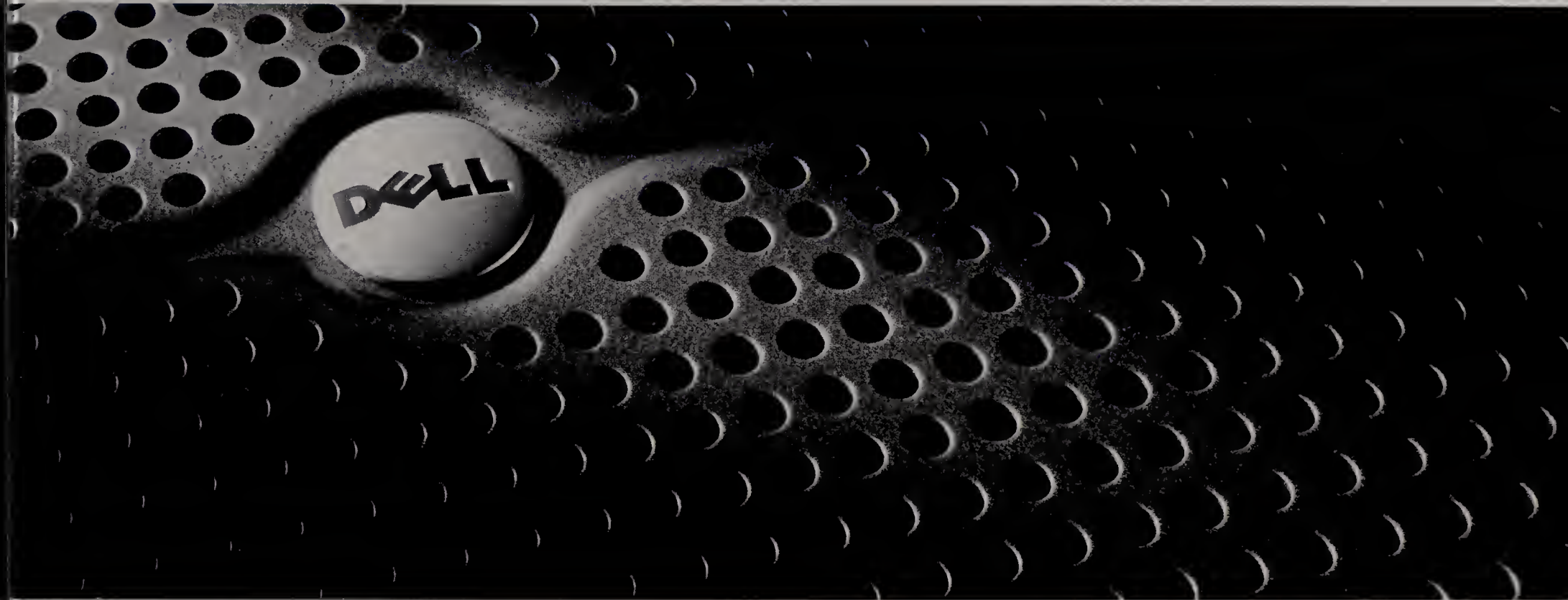
The disappointing results of Lowry's discussions with potential collaboration partners back up Maynard's theory that companies aren't yet sold on integrating systems. "We are talking about a depth of integration that they are not ready for yet," he says. From a purely technical standpoint, a collaboration partner would need to have a completely functional ERP system and modern CAD and PDM systems. That alone has scared off a few potential partners in an industry where many CIOs admit that most business is still done with faxes and phones.

Swift has taken on the job of chief salesman. Companies are enthusiastic as long as talks remain theoretical, but once Swift broaches the details of the integration, the excuses start. In addition to technical issues involving such things as integrating disparate ERP systems, Swift often hears about customers' fears that collaboration will result in layoffs.

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Collaborative Computing

And Swift doesn't dispute this. Linking with Goldman's collaboration efforts could, he acknowledges, cost midlevel managers their jobs, particularly those who work in purchasing. So unless a major player like Ford or GM forces Goldman's customers to collaborate electronically, Swift believes he'll continue to have a hard sell.

Furthermore, there are no rules in place to dictate how companies will collaborate once they clear the technological and cultural hurdles. One supplier Lowry talked to about collaborating in the design process didn't have the proper Catia software and didn't think it could justify the expense of buying it. Initially Lowry thought that the supplier could simply borrow a Goldman license and access the application through the Web. But lending the supplier a license means there's one less for Goldman to use and raises a host of other potential problems. "How do I know that they aren't using my license to do someone else's work?" Lowry asks. And if that's the case, should the supplier pay Goldman for the license? Vendors could do their part to ease this situation by supporting shared license agreements, but no vendor has offered Lowry this option.

Furthermore, if and when companies integrate their systems, what happens when one partner wants to upgrade? It's complicated enough to do it across several departments within a single organization; imagine the difficulties of upgrading across a network of companies. Lowry believes that companies working collaboratively will only be as fast as the slowest member. "If one member of a team is back in the '50s, then you're all back in the '50s." In other words, if one company in an integrated network of collaborators hasn't spent the money on the necessary systems, it will mute the benefits experienced by companies that have opened their wallets.

INTERNAL RETURNS

Lowry is still optimistic about the long-term potential of collaboration, and even without it he's already seen a return on Goldman's IT investment. He estimates saving



Group President Mark Swift (left) and VP of IT Jack Lowry are Goldman's top collaboration pitchmen.

\$700,000 because of reduced cycle times and increased sales through the e-commerce site in the first 18 months alone. For example, under the old order-and-inventory system, customers placed orders with engineers, who would review them before releasing them to the order-processing group. Engineers would spend weeks studiously examining each order, searching for nonstandard specifications, even though 95 percent of the

orders were for standard cutters. Now, information is automatically entered into the Baan system when customers place orders on the e-commerce site, and only those orders for nonstandard cutters are routed to engineering for analysis.

Goldman's position near the bottom of the supply chain puts the company in a poor spot to steer changes within the industry. Lowry says its suppliers have listened to his pitch but generally balk at the very thought of integrating systems with another company.

Lowry will continue talking to other companies throughout the supply chain. At this point, he's not even trying to convince them to join Goldman's collaboration ef-

orts. "I am going to educate these people about what we can do," he says. "Then the best-case follow-up is a meeting with more people. I'm beyond the point of thinking, I'm going to go in, talk to some key people, and it will happen."

If companies integrate their systems, what happens when one partner wants to upgrade?

So far, Lowry's at least getting his message across. Some companies Lowry has approached are indicating that they might be more receptive to collaborating sometime down the road when the practice becomes more widespread. Other companies are asking him for detailed technical requirements of Goldman's systems. It's an indication that small companies such as Goldman may be able to propel companies throughout the automotive supply chain to adopt collaborative technologies after all.

Lowry doesn't regret the decision to actively invest in collaborative technologies ahead of the curve. "It's not that you're a big player or a little player," he says. "It's that you're a player or you're not." **CIO**

E-mail your thoughts about collaboration to Staff Writer Ben Worthen at bworthen@cio.com.

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**Opinder Bawa,
former first CIO
of Netro, advises
company-first CIOs
to tread carefully.**

You Go First

Being the first CIO a company has ever had can be perilous or it can be a career-defining opportunity

OPINDER BAWA FACED A CROSSROADS in his career last October. As the head of professional services at a successful software company, he was ensconced in a comfortable IT position. Still, Bawa was intrigued when Netro, a broadband wireless access company in San Jose, Calif., was looking for its first CIO. The challenge of being a CIO and Netro's predictions that the \$100 million company would be a \$1 billion company in two years proved too compelling to resist. He accepted the job.

One year later, Bawa is another victim of the tech wreck. After routinely turning in \$25 million to \$30 million a quarter, Netro closed last quarter at slightly more than \$2 million. Despite Bawa's efforts to establish the CIO role and develop

organized IT processes, his position was eliminated in the carnage. The lesson Bawa, who has since started his own IT consultancy, has taken away: Tread carefully.

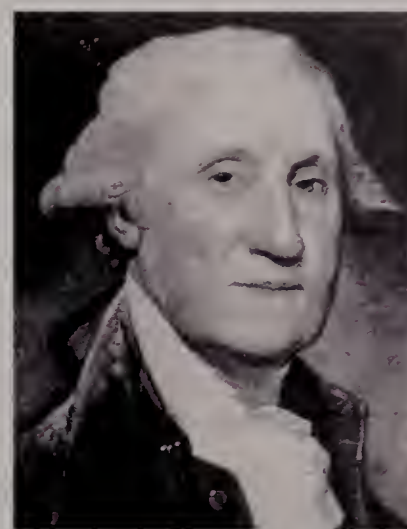
Reader ROI

- Identify the perils of being the first to serve as CIO
- Determine the career opportunities that come with being first

He admits there were several red flags he should have paid more attention to when he considered the position. First was the tiny backlog of orders Netro had in hand when he joined the company, and second was the growing amount of Netro inventory stuck in its distributor channels. "It's embarrassing to admit, but I got caught up in the standard story of how their stock would go from \$100 to \$700," Bawa says. "Had I paid attention to the signs, they would have clearly shown me that this would have been one of the hardest hit markets in the downturn."

Even under the best circumstances, the day-to-day reality of being a company-first CIO can be brutal. There is resentment from people loyal to the previous IT administration, suspicion from people skeptical of the new position, and resistance from departments and business units used to doing things their own way. Even when a company-first CIO does all the right things to solidify the role, there's the risk that the company

FAMOUS FIRSTS



BY ERIC BERKMAN

Career Moves

won't be committed to the position in the long run.

Ray Causey is a good example of that situation. He took over as CIO of San Diego-based Mail Boxes Etc. (MBE) in 1999 and went to great lengths to establish his role among management and IT staff.

Two years later, Causey's pet project—a \$25 million satellite link between 3,500 domestic franchises and corporate systems, an Internet-enabled point-of-sale system and an Internet-based shipping system—has faced harsh public criticism and franchisee revolt (see “P.O.’d,” *Darwin*, www.cio.com/printlinks), but that's not the worst of it. Since Causey spoke with *CIO* for this story in July, MBE eliminated his position. He was not available for comment after leaving. MBE spokespeople say his position was eliminated as part of a corporate restructuring that followed MBE's merger with UPS this summer and that his decision to accept “early retirement” was not performance-related. Still, before leaving MBE, Causey acknowledged that being a company-first CIO “can be a huge headache.”

Nevertheless, some company-first CIOs have enjoyed success both within and as a result of their new roles. Despite the obvi-

rewards can be huge. People recognize that if the company-first CIO can do this job, he can do any job. He becomes that much more marketable—and can command a higher price tag or a higher profile in his next job.

Kim Nelson is a clear example of that. She pioneered the CIO

People don't know who you are or
what your role is supposed to be.
This can make them a little paranoid.

—James Smith, first CIO of Mayer Electric Supply

role at the Pennsylvania Department of Environmental Protection (PDEP) agency in Harrisburg, Pa. The visibility she gained while establishing the CIO position at PDEP resulted in President Bush nominating her to be the new CIO of the Environmental Protection Agency (as of press time, she hadn't gone through her Senate confirmation hearing). “[Being the first CIO of my agency] provided me with a lot of visibility in terms of the splash of creating the role,” she says. “I’ve often been contacted by other state [DEPs] asking me to tell them how I did it. And that’s raised my profile in terms of being a leader.”

Politics as Unusual

THE FIRST AND PERHAPS BIGGEST CHALLENGE A company-first CIO faces is establishing credibility among users, IT staff and fellow executives. When entering an organization that's never had a CIO, there are likely to be few organized processes around the use of technology, upgrades and support. Various departments and business units will be used to freelancing their own IT initiatives—a fact that obviously creates chaos. Worse yet, people don't know who the CIO is or what his role is supposed to be. This can make them a little paranoid, says James W. (Wes) Smith, the first CIO of Mayer Electric Supply, a \$340 million electrical equipment distributor in Birmingham, Ala.

When Smith took over as CIO in January 1999, his first order of business was to finish moving from legacy systems to the J.D. Edwards OneWorld ERP system. Unlike Causey, Smith rose to the position from within the company, having worked in finance, internal audit

and quality management. He'd been leading the effort to select an ERP vendor and implement the project. Midway through vendor selection, he convinced management the company needed a CIO and that he was the guy. “With the ERP project, we were tearing



Smith stood up for his IT staffers early on, which helped win their confidence.

ous perils, they say this type of challenge can be just the thing to shake someone out of midcareer inertia. There's the rush of being a trailblazer and the freedom of starting with a clean slate, unfettered by the constraints of how the last CIO did things. Plus, the

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out our whole infrastructure and putting in a new one," he says. "In the process, I saw that technology would be critical to our business future and felt we needed one person to set the future direction."

Since Smith came from a business and not an IT background, the IT staff was initially suspicious of him and his intentions. Those suspicions grew when they heard the CFO and board of directors wanted to "put a fence around the IT folks"—limiting their role to managing existing systems—and hire consultants to do the ERP implementation. Smith stood firm and insisted that IT do the job. That display of standing up for his employees went a long way toward winning their confidence. "It made the point that the company's support was with them and that we had full faith and confidence they could do the job," says Smith.

A company-first CIO also has to deal with fears among staff members that their jobs are about to get a lot tougher, Causey says. The appointment of a CIO is taken as a sign that the company is raising the bar when it comes to IT, he says. People realize their old ways of just punching in and doing the bare minimum won't fly, and they fear being exposed as less valuable than everyone thought. More significantly, they fear adapting to wholesale changes in the way the company deploys technology.

When Causey joined Mail Boxes Etc., he addressed those fears directly by meeting with IT employees to share their vision, discuss their role in his initiatives and assure them that he had no plans to clean house. He also held departmental bonding sessions such as golf tournaments and trips to San Diego Padres games. "I tried to create an inclusion mentality," Causey told *CIO* shortly before leaving the company. Even those efforts failed to completely overcome apprehension among the staff. Causey suf-

A company-first CIO has to deal with fears among staff members that their jobs are about to get a lot tougher.

—Ray Causey, former first CIO of Mail Boxes Etc.

fered 27 percent turnover in his first year and a half, which he attributes largely to the dotcom boom but also to the aforementioned fear and distrust. "These people didn't give my new system a chance to get them to the necessary level," he says.

Expectation management is another issue company-first CIOs will face. Users and executives alike frequently see the CIO as a "silver bullet" who is going to solve a company's technology



Mail Boxes Etc.'s Causey saw his CIO position eliminated.

woes, says Bawa, the former first CIO of Netro. If everyone expects too much, the CIO is destined to fail.

The best way to address this, Bawa says, is to get non-IT people involved in major IT decisions. While at Netro, he did that by establishing a CIO Council that reviewed and prioritized major IT projects proposed by different business managers. He appointed several key executives to the council and served as its chairman. Through the council, he was able to evangelize certain best practices and help other executives understand project time lines and payoff. While he would still shape the company's IT direction, the council approved projects that would cost more than \$20,000, which eased some of his burden.

PDEP's Nelson tried something similar in her agency. Nelson, who became CIO in October 1999 as part of the state's e-government initiative to put government services online, created an IT council to set the agency's technology priorities. The council has struggled as a policymaking body, she says, because it has been difficult to get non-IT people to participate, as they've been reluctant to add to their workload. Also, council members have been hesitant to make decisions regarding IT priorities, saying that they don't feel competent. While those are issues any CIO might face, the fact that Nelson's agency is not used to dealing with a CIO—or with IT at a strategic level—only intensifies the challenge.

The council has successfully informed people about IT projects on the horizon, but for now, Nelson makes the final decisions. This is fine in the short term, she says, but it would be better if people from higher levels of the organization were participating in the decision-

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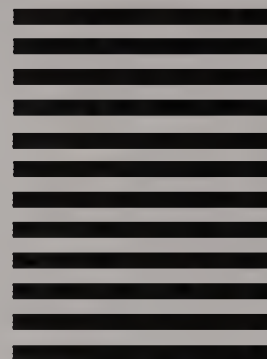
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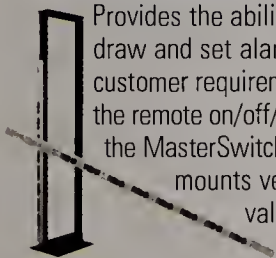


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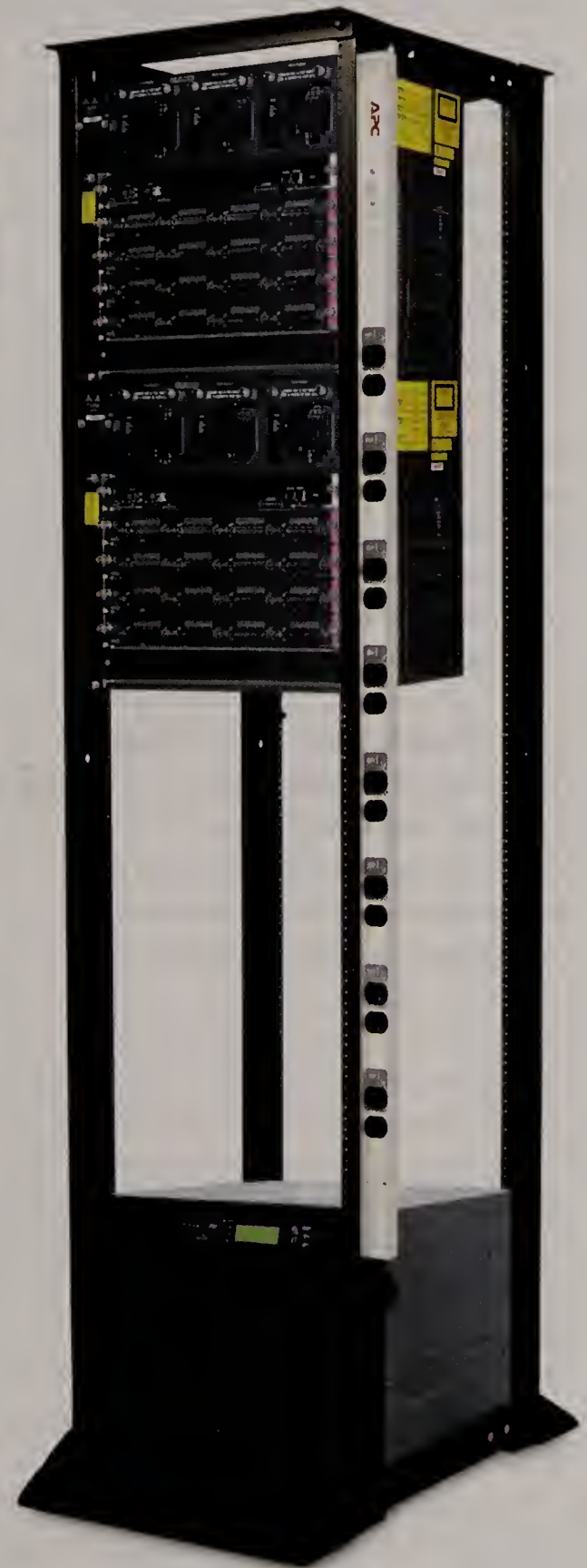
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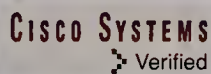
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To Boldly Go Where No CIO Has Gone Before

Follow these steps to solidify your spot as your company's first CIO

1 BE ON THE SAME PAGE. Before you accept the job, make sure you and the executives agree on your IT vision and how you're going to pull it off. If the executives aren't behind you, no one will be.

2 DON'T CRITICIZE THE WORK OF YOUR PREDECESSORS. There may not have been a CIO, but somebody was in charge of IT. "Your predecessors have history, respect and relationships within the organization," says Kimberly Nelson, the first CIO of the Pennsylvania Department of Environmental Protection. "Nurture them to your benefit."

3 FIND SOMEONE YOU TRUST TO HELP YOU NAVIGATE YOUR COMPANY'S CULTURE AND BUREAUCRACY. "Not only do you have to introduce yourself to the company, you have to introduce your position and perhaps a whole new organ-

ization," Nelson says. "If you don't understand the people, values and mores, you can spend a lot of time spinning your wheels."

4 STEP BACK AND CATCH YOUR BREATH. Don't be swept into immediate projects without taking the time to survey the environment and playing field, says Ray Causey, former first CIO of Mail Boxes Etc. Take a month or two to review the state of your company's technology. Then you'll make smarter decisions about which projects to pursue, which to curtail and which to terminate.

5 ESTABLISH BASIC PRACTICES AROUND I.T. REQUESTS AND ENHANCEMENTS. With no prior CIO, your company most likely lacks any organized procedure for processing internal customer demands. The employees are

used to doing things ad hoc or even by themselves. Creating a process can be a quick first step toward consolidating IT and developing a technology strategy, says Opinder Bawa, the former first CIO of Netro.

6 MEET WITH I.T. STAFF ONE-ON-ONE. They'll better understand you, why you're there and how they fit into your plans, Causey says. If you're lucky, you may just win them over.

7 FORM A COUNCIL OF I.T. AND BUSINESS LEADERS TO SET TECHNOLOGY PRIORITIES. It's your chance to educate executives on what IT can or can't do and how long projects will take. It's a chance for them to articulate their needs. It's also a chance for the whole company to develop realistic IT expectations, Bawa says. **-E.B.**

making process. She uses other means to keep non-IT people involved in technology decisions. "Occasionally, I'll go back to the executive staff and say, 'OK, here's the issue, and here's three recommendations for moving forward. What do you want to do?'" she says.

If PDEP was more used to dealing with a CIO—and to IT being done on a departmentwide basis—it'd probably feel more comfortable taking a more proactive role in making decisions, says Nelson. As the CIO position evolves with her successor, Karen Bassett, she expects that to happen.

As a company-first CIO, Nelson also struggled to get people from the business (or in this case, the agency) involved in developing and implementing IT projects. Since there was no prior CIO to advocate strong ties between business and IT, Nelson had to create that relationship.

That came into play during a development project called eFacts (Environment Facility Application Compliance Tracking System), an agencywide system to track agency-regulated people and places. About a year into the project, Nelson was still having trouble getting non-IT people involved. Managers would either give up their most expendable person—who wasn't necessarily the right one for the job—or the right

people would be too bogged down with their existing responsibilities; so she went back to the executive staff and demanded dedicated help. They responded by physically relocating people from other departments, such as air-quality information, water-quality information and waste information, to an area of the building where they could work

Don't consider a company-first CIO position if you're not convinced the CEO supports the idea.

full time with IT staff on application development. "We called the area the Tiger Den, and we saw a huge improvement in the project's progress," says Nelson. "We had people from agency program staff reviewing the deliverables, making sure the requirements documents were accurate, looking at screen designs and writing test plans."

That set a precedent for future projects by extending a hand to program staff outside IT. "A lot of [non-IT people] felt threatened by the creation of the CIO position because it means a loss of control,"

Nelson says. “[Assigning non-IT people to the IT project team] helps the first-time CIO walk that fine line between having an enterprise solution and still communicating with the internal organizations.”

Singular Technology

WHILE A COMPANY-FIRST CIO MAY START WITH A CLEAN slate, unfettered by the constraints of how the last CIO did things, don’t expect the job to be any easier than Causey’s, Smith’s or Nelson’s. Besides the human challenges—such as resistance, resentment, suspicion and managing user expectations—there are technical challenges—such as creating a



Dave Dutton, first CIO of Sun Community Bancorp, had to persuade the company’s 20 local banks to use common processes.

unified technology infrastructure, centralizing IT and aligning it with the business, and implementing companywide IT standards.

Other sensitive challenges often faced by company-first CIOs are technology consolidation and creating enterprisewide standards. A company that has never had a CIO is likely to have

a dispersed IT infrastructure with various business units or locations doing their own thing—and quite used to doing their

own thing. All of a sudden, a CIO comes in and changes all that, so there’s a high danger of backlash.

Bawa had to change the company’s entire attitude toward technology. Before he arrived, department managers initiated and completed IT projects themselves, using the easiest and fastest technology at the time. Bawa felt major projects should be centrally approved, with an emphasis on newer, more scalable technology, instead of cheaper and more quickly integrated legacy technology.

He brought the departments around, he says, through a combination of diplomacy and caution, but also by making sound business cases with statements like “If you invest in more legacy technology at this stage, it might be faster and cheaper now, but it’ll be more expensive to change in a year.” Still, Bawa faced several difficult moments. In one instance, the company was having a tense moment with a client. Resolving the situation required making changes to legacy systems. “This required a balancing act between how strictly to apply the new corporate standards and what changes were required to satisfy the external client,” he says.

Sun Community Bancorp’s first CIO Dave Dutton also dealt with consolidation issues. Prior to his arrival, each of the company’s 20 local banks handled their own IT decisions. He had to come in and centralize and persuade a bank president that moving to a common process is cost-effective. “It’s a matter of convincing them that we can provide better support if the 20 banks agree to use the same products,” Dutton says. “Fortunately, I’ve had the absolute support of the executive management of the corporation, which creates an immediate element of trust.”

That raises another important point: Don’t consider a company-first CIO position if you’re not absolutely convinced the CEO supports what you’re doing and how you’re doing it. Without executive support, you’ll never gain credibility among users and IT personnel. “I was pretty clear with the executive staff during the interview process that I’d form an IT council who’d then determine priorities, not me personally or individual executives,” says Bawa. “Getting understanding on these points is the biggest thing.” Bawa just had the misfortune of signing up just as the economy headed south and his company began losing money.

As daunting as all this may sound, being a company-first CIO is a great opportunity. It’s more than just a challenge, Causey says. It’s a chance to be a revolutionary. “Outside of taking care of my family, making money and doing the best I can, I have a selfish desire to rule the world,” he says. Unfortunately, Causey is going to have to look elsewhere to achieve this desire. He can chalk up his MBE experience to the perils of trying to pioneer the CIO role. **CIO**

Are you the first to take the reins as a company-first CIO? Tell Senior Writer Eric Berkman about your experience at eberkman@cio.com.

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To read more about the CIO role, visit our **CIO EXECUTIVE RESEARCH CENTER** at www.cio.com/executive.

Will You Still Love It Tomorrow?

Getting a wireless program to work today is no problem. Living with it tomorrow is another matter. Here's how to do it.

BY BEN WORTHEN

CIO Perry Lipe wants his company's corporate data to be available anytime, anywhere for employees and customers alike. To achieve that, he plans to use wireless devices. But rather than invest in soon-to-be-obsolete technology or force a costly and premature architecture implementation, he's giving himself until 2006 to figure it out.

Lipe's experiments with wireless projects began in July 2000 when auto-part makers Arvin Industries and Meritor Automotive merged, creating ArvinMeritor, the \$7 billion Troy, Mich.-based company. By 2001, wireless access to corporate data was one of the core components of his five-year strategic plan. However, that component of his plan is intentionally vague—particularly as it relates to architectural changes. "Building the application isn't rocket science, but we don't know about the impact on the infrastructure

Reader ROI

- Find out why many of today's wireless projects are throwaways
- Learn the benefits and drawbacks of an n-tiered architecture for wireless applications



ArvinMeritor CIO
Perry Lipe *will not*
allow wireless access to
corporate data until the
consequences of doing
so become clearer.

The irony of most of today's WIRELESS projects is that their SUCCESS will eventually lead to their DOWNFALL.

or the expenditures we will have to make to support the right middleware," Lipe says.

As Lipe suggests, functional wireless applications can be easy to build. At first glance these applications are a cheap and easy way to make mobile workers more efficient—any programmer worth his paycheck can rig up a server and write code that gives

Palm or BlackBerry users access to information in a particular database. And it is increasingly difficult to resist: A March 2001 Forrester Research survey found that 60 percent of wireless projects at 3,500 global companies were not part of an organizationwide wireless plan but were one-off applications designed to address a specific need, linking

one type of device with one data source.

The business benefits of these one-off applications, however, rarely equal their hidden cost, and the irony of most of today's wireless projects is that their success will eventually lead to their downfall. Wireless applications, whether for sales-force automation or e-mail access, make mobile workers' lives easier, and thus will be popular. But one-off wireless projects have problems: They won't scale, support multiple devices or handle complex transactions. As the applications attract more users, their flaws will be exposed.

The best way to support enterprise-level wireless applications is with an n-tiered architecture, which is a multilayered architecture complete with middleware for queuing and delivering data to any device. "The n-tiered architecture makes it easy for us to adapt to wireless and be flexible without putting additional strain on our back end," says Jeff Scott, CTO of New York City-based Thomson Financial, a \$2 billion financial information company. "If a company is going to build a wireless delivery mechanism into its architecture then it needs to be n-tiered."

But converting to an n-tiered architecture is neither cheap nor easy. Larry Mittag, vice president and CTO of San Diego-based systems integrator Stellcom, says that depending on the size of the project, an n-tiered implementation can run into the millions or potentially tens of millions of dollars, and it could take anywhere from six months to several years to complete.

Numbers like those create a serious hurdle—one that most companies aren't in a position to clear at the moment. But as the benefits of wireless applications become clearer and wireless technology itself matures, business needs will demand an n-tiered architecture to support enterprise-level wireless applications. However, a CIO

Thomson Financial CTO Jeff Scott: *If a company is going wireless, the architecture "needs to be n-tiered."*



PHOTO BY CHERRY KIM

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Wireless Technology

who doesn't understand the implications of the wireless applications he builds risks having to convert to an n-tiered architecture before he is ready or, worse, could end up supporting obsolete wireless systems for years.

Meeting Needs

Without an n-tiered architecture, one-off wireless projects can fall into three major traps. The first is the inability to scale. Thomson Financial was just implementing an n-tiered architecture to facilitate Internet data delivery when Scott came on board five years ago. And while he will not reveal all the details of the project, Scott says it cost millions of dollars and took several years to complete.

In the fourth quarter of 2000, Thomson continued its leading-edge information delivery with First Call, a financial information application that lets investors use their wireless devices to tap more than 800 brokerage houses for real-time corporate earnings data from more than 18,000 companies. As a subscription service, it needs to be accessed by as many people as want it—Scott cannot control the number.

A grassroots wireless application built outside the corporate IT infrastructure wouldn't have scaled because it would not support the queuing needed to handle an unlimited number of data requests. Thomson's users must establish a new connection for each transaction; a database that could accept only one transaction at a time would be both time-consuming and frustrating.

The middleware layer in the n-tiered architecture can queue requests for data so that a



Maritz CIO Gil Hoffman: "We're making sure we don't get into wireless for the technology's sake."

The second trap is supporting a wireless application that works only with a soon-to-be-obsolete device. Gartner estimates that by 2004 wireless devices will outnumber PCs, and Ken Dulaney, Gartner's San Jose, Calif.-based vice president of mobile computing, says the devices that will be on the market then haven't been invented yet. Accordingly,

would support multiple wireless devices. When doctors visit hospitalized patients, they traditionally record the services rendered on note cards, eventually submitting them to hospital administrators who in turn bill insurance companies. Between lost cards and illegible handwriting, about 10 percent of billable charges—around \$1 million for a 100-doctor hospital—go uncollected, according to Sutherland.

With PatientKeeper's system, doctors can use wireless devices to record the services rendered and update the billing system in real-time. But Sutherland says most doctors already have devices they use for personal information and would rather not be forced to change. He found that an n-tiered architecture was the only way to design a system that would take into account their

If a CIO wants his APPLICATION to last, he must plan for access by multiple DEVICES.

user can stay connected during the second it takes to process his request. Since the middleware was already in place as part of the n-tiered architecture, the entire First Call application cost only a few hundred thousand dollars, Scott says.

if a CIO wants his application to last, he must plan for access by multiple devices.

That reality forced Jeff Sutherland, CTO of Brighton, Mass.-based PatientKeeper, a wireless provider for health-care companies, to design a hospital-focused system that

preferences. PatientKeeper supports front-end application program interfaces (APIs) for PalmOS and WinCE devices. There are more than 3,000 standard interfaces on the back end for integration with legacy health-care systems.

The centralized architecture means that the system will last, and Sutherland has harsh words for the alternative. "I view all of these point and departmental applications as throwaways," he says. "I am going to want to deploy really useful applications across the enterprise. And to do that I am going to have to boot out all these point applications with a specific device or a specific data source."

The third potential problem with one-off projects is their inability to process transactions that require data from multiple sources. An n-tiered architecture allows

plex transaction, which requires message queuing available only with middleware, is unattainable with one-off wireless projects that limit interactions to one data source. During the past five years, the company has developed an n-tiered architecture to support high volume, multidatabase transactions, Hoffman says.

When to N-Tier

Implementing an n-tiered architecture is costly. In the case of PatientKeeper, the ROI was obvious. In Thomson's case, an earlier conversion made pioneering wireless applications practical. However, for most organizations, the still-uncertain character of future wireless usage makes the ROI difficult to divine.

Forrester Senior Analyst Frank Prince says that because of the cost and complex-

Neither application requires granting devices wireless access to corporate data, a step Lipe isn't willing to take until he understands the consequences better. Lipe is particularly leery of consultants and salespeople, the lions, tigers and bears (oh my!) of the wireless world. If you believe everything you hear from wireless vendors and rush in headfirst "you can find yourself in the position where you commit to a direction that you don't understand," he says.

In fact, just having an n-tiered architecture isn't a reason to extend applications to wireless devices. The wireless travel application Maritz's Hoffman describes is still at least two years away. "I wouldn't say we are scared, but we are approaching wireless with eyes wide open," he says. "We're making sure we do not get in it for the technology's sake. We need to make sure that we get the

best return." There isn't yet a demand for wireless access to hosted services like travel booking, and Hoffman says he is going to hold out as long as he can. But he anticipates that in two years Maritz will have close to a dozen applications that

will be accessed wirelessly and notes that they will likely replace the one-off applications he has now. In the meantime, he hopes APIs and standards will mature.

Eventually a company running wireless applications will need an n-tiered architecture to support them. "If you are going to play the [wireless] game you have got to have a good, reliable, scalable back-end infrastructure," Hoffman says.

A CIO who fully understands the consequences of one-off wireless projects and sets realistic user expectations can certainly pursue those projects until an n-tiered implementation makes sense. But according to Hoffman, a CIO whose company becomes dependent on one-off wireless projects "risks making the same investment over again in just a couple of years." 

Staff Writer Ben Worthen covers wireless for CIO. E-mail him at bworthen@cio.com.

For most ORGANIZATIONS, the still-uncertain CHARACTER of future WIRELESS USAGE makes the ROI difficult to divine.

for this kind of interaction. For example, Fenton, Mo.-based marketing services company Maritz hosts travel services for its corporate customers, and the complex interactions it requires, such as travel booking, won't work without an n-tiered architecture since travel booking also requires several interactions with different databases. Most of today's wireless applications, such as e-mail, are single-transaction based. That model won't translate to Maritz's travel application, which CIO Gil Hoffman says must request an itinerary, give choices, make a reservation and return a confirmation number as well as handle credit card information. This kind of com-

plexity of enterprisewide wireless, companies that can't calculate clear ROI are better off delaying an n-tiered implementation—maybe even for a couple of years. "Look at the problems people have just with enterprise-level CRM," he says. "And now we are going to define a standardized architecture and enforce it over a rapidly changing environment where we are not sure what will happen? The chances of getting it wrong are pretty good." Prince says that unless a CIO sees an overwhelming ROI, he is better off pursuing carefully controlled one-off applications while wireless matures and APIs improve.

That's the approach ArvinMeritor's Lipe is taking. "All we can do is make sure that we are ready when the time comes," he says. Currently his staff is implementing and evaluating low-cost, low-visibility projects like downloading intranet content to PDAs and a device-resident company phone directory.

CIO.com

Check out our March 15, 2001, **SPECIAL REPORT** on wireless technology at www.cio.com/archive/031501/special.html.

DRUG COMPANIES ON

S

The marriage of IT and medical research is accelerating the pace of drug discovery and may be just what big pharmaceutical companies need to survive in an increasingly competitive field BY STEPHANIE OVERBY

SCIENTISTS AT

Aventis Pharma had just finished animal testing on a promising new drug to treat asthma, and they knew they had to move fast. Two of their biggest competitors, GlaxoSmithKline and Schering-Plough, had similar treatments further along in the drug testing pipelines. Both companies were already proceeding with human trials to test the effectiveness of the same approach Aventis was studying—an anti-interleukin-5 (anti-IL-5) therapy designed to inhibit a protein thought to foster asthma attacks. So rather than starting late down the same protracted and pricey path, Aventis embarked on an unusual shortcut; it turned to Entelos, a Menlo Park, Calif.-based company, to run a new kind of software that could simulate a clinical trial on two virtual asthmatic patients named Alan and Bill. Results from the computer simulation program led Aventis to doubt that the anti-IL-5 therapy would be an effective agent against acute asthma attacks. The same conclusion was reached by its competitors after years of expensive clinical trials.

The biosimulation technology that Aventis used to achieve such cost-effective results is just one in a growing arsenal of new information technologies that offer tremendous potential to streamline and reduce the costs of drug development. Grouped under the umbrella of bioinformatics, these technologies all involve the use of computers to store, organize, generate, retrieve,

Reader ROI

- ▶ Learn how IT is bringing the pharmaceutical industry into the information age
- ▶ Discover why the big pharmaceutical companies are betting billions on bioinformatics
- ▶ Find out how CIOs are taking a central role in reshaping the drug discovery process

PEED

analyze and share genomic, biological and chemical data for drug discovery. And their usage is spawning an entirely new branch of IT.

"It's a magical time in the history of science now that we have so much computing power and storage capacity," says Robert Dinerstein, a senior research scientist in the Bridgewater, N.J., laboratories of Frankfurt, Germany-based Aventis Pharma.

It wasn't always so. The pharmaceutical industry, a conservative bastion of empirically minded scientists, has been slow to embrace new technologies. And, in fact, for much of the 20th century not much changed about the trial-and-error process of creating new medicines. Historically, the drug discovery process has invariably begun with a theory about the possible cause of a particular disease. "Some idea got us started—either from scientific literature, a particular researcher's expertise or just someone's crazy idea," Dinerstein explains. The preclinical research continues with the synthesis and purification of a compound that appears to affect a certain protein or molecule thought to be involved in the disease process. Using test tubes and petri dishes, scientists then conduct efficacy and safety tests on that compound or drug candidate. If it passes that hurdle, they move to more extensive preclinical and clinical testing processes to determine how the body responds to the com-



“IT'S A MAGICAL TIME IN THE HISTORY OF SCIENCE NOW THAT WE HAVE SO MUCH **COMPUTING POWER AND STORAGE CAPACITY.**”

—ROBERT DINERSTEIN,
SENIOR RESEARCH SCIENTIST,
AVENTIS PHARMA

pound—how it's absorbed, distributed, metabolized and excreted (pharmacokinetics)—as well as the chemical effects of the drug on the body (pharmacodynamics). Then the testing begins on animals and proceeds to three phases of clinical trials in humans.

But the old-school approach to drug development is expensive, time-consuming and prone to failure. Nearly 75 percent of the 5,000 drug candidates currently tested in these different phases fall short of expectations and never reach the market. Factoring in the cost of all the drugs that fail, drug companies spend an average of \$880 million and 15 years to develop each new drug that does make it to market, according to a recent study by the Boston Consulting Group. And, of course, they pass those costs on to the consumer (employers, hospitals, insurance plans and patients) with prescription drug markups that have become the target of increasing criticism.

Such high costs (and the ensuing negative publicity) have finally brought the pharmaceutical industry, kicking and screaming, into the IT age. In fact, bioinformatics may be just the shot in the arm drugmakers need to survive in an increasingly competitive and consolidating field. By fully integrating these new technologies, analysts say, pharmaceutical companies could cut the cost of creating a new drug in half and shave two to three

WHAT IS Bioinformatics?

Bioinformatics is the use of computer technology to store, organize, generate, retrieve, analyze and share genomic, biological and chemical data to support the drug discovery process.

years off the development. In addition, informatics holds the promise of uniting what have traditionally been separate research and development efforts within the same companies.

"We're an information-based industry, but we've been a bit behind in the extent to which we've been using computer-based tools," Dinerstein says. "They've had better computer models for oil drilling than we've had for drug discovery."

While executives in this closely guarded industry won't say how much they're investing in research and development informatics, they are definitely hopping on board. Merck & Co. in Whitehouse Station, N.J., recently paid \$620 million to acquire Rosetta Inpharmatics, a genomics and technology company based in Kirkland, Wash. And New York City-based Pfizer says it recently spent more than \$100 million to

create an "integrated system of high-speed discovery technologies." Pradip Banderjee, a senior partner with Accenture Consulting, conservatively estimates that drugmakers as a whole spend more than \$4 billion a year on that kind of technology, not including the cost of hardware. But compared with the cost of a clinical trial—particularly a failed one—it's not much. "We spend tens of millions of dollars on early clinical trials. If you could use this technology to tell someone early on whether or not to do a clinical trial, that would be significant," Dinerstein notes.

Gigabyte Glut

Bioinformatics may also be the only way drug companies can deal with the gigabytes of data they produce and receive every day. The pharmaceutical trade organization Pharmaceutical Research and Manufacturers of America predicts that by 2003, scientists will have discovered more than 10,000 potential targets for drug development, resulting in what some call "target glut." And that number will only get larger thanks to the 30,000 genes and an exponentially greater number of proteins being identified and analyzed in the Human Genome Project. At the same time, combinatorial chemistry allows companies to synthesize more than 100 compounds per chemist per year. "Informatics is how you deal with the

The Definitions of Life

DNA sequence

The sequence of nucleotides in DNA, the molecules that control all hereditary characteristics.

Gene A hereditary unit consisting of a sequence of DNA that occupies a specific location on a chromosome and determines



a particular characteristic in an organism.

Gene expression The process by which a gene's coded information is converted into proteins and

other molecules carrying out crucial activity within the cell.

Gene expression study using microarrays The use of microarrays—high-density,

1-inch-square glass chips (similar to microchips) containing thousands of pieces of DNA—to study the activity of thousands of genes in response to many different types of stimuli. Researchers use microarray analysis to find out whether a gene is overexpressed or underexpressed in

diseased cells as compared with normal conditions, how genes from different cells in a body differ in their reactions

or how a gene reacts to a certain compound.

Genomics The branch of genetics that studies the DNA sequences of



“TO DO INFORMATICS CORRECTLY YOU NEED TO BLEND SCIENTIFIC SKILLS AND I.T. SKILLS. OTHERWISE YOU GET TECHNOLOGY WITHOUT A PURPOSE.”

—RICK ROBERTS, GLOBAL HEAD OF DISCOVERY RESEARCH INFORMATICS, PFIZER

amount of data being generated,” says Rick Roberts, global head of discovery research informatics for Pfizer.

In the past five years, most big drug companies have created official informatics departments, either by integrating their research and IT departments or by creating close ties between the two. But the unofficial origins go back further. “It started as an outgrowth of the scientific discipline as opposed to IT,” says Nathan Siemers, group leader of bioinformatics at New York City-based Bristol-Myers Squibb. “Basically it’s been a research endeavor, but over its evolution it’s become more infrastructure-related. More people need access to this information, and the scale of information we have to disseminate to our clients—the researchers—is growing drastically. So our ties to IT, which originally were almost nonexistent, have

become stronger and stronger.”

Today, there are informatics technologies popping up to help at nearly every stage of the drug development process. Early on in the process, bioinformatics technology allows researchers to analyze the terabytes of data being produced by the Human Genome Project. Gene sequence databases, gene expression databases (which track how genes react to various stimuli), protein sequence databases and related analysis tools all help scientists determine whether and how a particular molecule is directly involved in a disease process. That, in turn, helps them

find new and better drug targets.

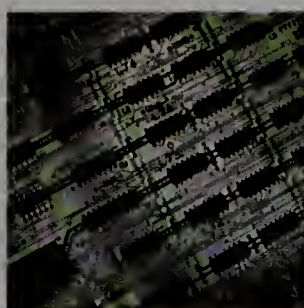
Using IT analysis tools and genomic databases, for example, Merck researchers were able to compare the entire genome sequence for mice and humans. They not only discovered that the two genomes were 90 percent identical, but they also found a gene in mice that might have the same function as a gene that may be involved in schizophrenia in



PHOTOS BELOW BY PHOTODISC; RIGHT BY PETER GLASS

organisms to determine what specific genes do and how we might be able to use this knowledge for therapeutic interventions.

High-throughput screening The testing of potential compounds from a combinatorial library or other compound collection for biological activity in an accelerated mode (in



groups of hundreds or thousands rather than 10 or 20) made possible through the use of automation and robotics.

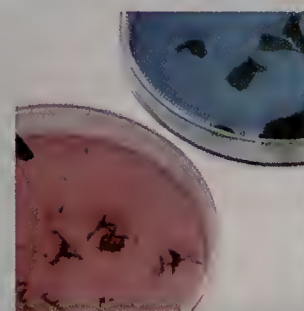
In silico Within a computer.

In vitro Within an artificial environment that is outside a living organism.

In vivo Within a living organism.

Lead optimization The modification of a biologically active compound in vitro, in vivo and in silico to test and improve its safety and efficacy for clinical usefulness.

Pharmacodynamics The chem-



ical effects of a drug on the body.

Pharmacokinetics How a drug is absorbed, distributed, metabolized and excreted in the human body.

Proteomics The identification of proteins and the determination of their location, interaction, activities and ultimately their function. —S.O.



THE ROLE OF I.T. IS CENTRAL TO SUCCESSFUL RESEARCH AND DEVELOPMENT AT AVENTIS. "THIS VISIBILITY HAS MOVED THE ORGANIZATION FROM THE BACKGROUND TO **FULL PARTNERSHIP.**"

—PETER LOUPOS, VP OF DRUG INNOVATION AND APPROVAL INFORMATION SOLUTIONS, AVENTIS

humans, says Richard Blevins, who has been Merck's director of bioinformatics for three years. Currently Merck is working with genetically altered, or "knock-out," mice, in which certain genes are altered to create a specific mutation (schizophrenia, in this case) to see how the animals react to drug candidates. This research, still in the very early stages, could eventually lead to a target for a new schizophrenia drug, Blevins says.

Similarly, Bristol-Myers Squibb has discovered a novel method for treating epilepsy using gene-sequencing mining tools. The particular drug candidate isolated for this research has since shown strong efficacy in knock-out mice and is nearing clinical trials, according to Siemers of Bristol-Myers Squibb.

Drug companies also employ a variety of cheminformatics software—tools that can predict the activity of a particular compound by studying its molecular structure. For instance, scientists can use molecular modeling software (tools that rely on interactive 3-D visualization or mathematical algo-

rithms) to discover and design safe and effective compounds. Chemical databases allow researchers to store and retrieve compounds and related data. Robotics makes it possible for chemists to synthesize hundreds of thousands of chemical compound varia-

tions from a library of simpler molecules in a short amount of time. High-throughput screening technology (see "The Definitions of Life," Page 116) allows researchers to screen thousands of compounds at once, rather than just 10 or 20.

Technology may help at the clinical testing stage too, though it has been a bit slower to catch on. Virtual patient simulation software, like the Asthma PhysioLab program that showcased virtual patients Alan and Bill, can simulate patients, targets and therapies in order to predict experimental outcomes before companies commit major resources to lab research and clinical trials. Essentially, this software helps predict the effect particular compounds have on the human body.

Integrating Informatics

The chief challenge for CIOs is piecing together all those diverse technologies into a fully integrated drug discovery process. Given that hundreds of vendors are jump-

ing on the bioinformatics bandwagon and there are very few standards, that is no small feat. "R&D chiefs and CIOs are looking at all of these immature technologies in a quickly evolving marketplace and are being forced to spend quickly," explains Craig Wheeler, vice president of Boston Consulting Group. "But it's necessary to put it all together—in silico [in the computer], in vitro [in test tubes] and in vivo [in life]—to get any real value out of it."

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In order to do that, they've had to call in the IT troops, which have long been isolated from the lab scientists. Whether as a part of a new informatics department or working hand in hand with research, the role of IT is becoming increasingly important in the pharmaceutical industry. Peter Loupos, Aventis's vice president of drug innovation and approval information solutions, studied molecular biology and genetics as an undergraduate and IT as a graduate student. He now sits on the leadership team for drug discovery at Aventis and has watched the role of IT evolve.

Just five years ago, IS was a relatively iso-



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lated department responsible for providing infrastructure and operational support at Aventis. Today, the company's far-flung research teams depend on sophisticated software and hardware to do their jobs. The early phases of drug development are often done *in silico*, Loupos notes. "Similarly, it is impossible to perform global clinical trials and prepare [Food and Drug Administration] submissions unless the process is implemented with an e-business philosophy. This means that as an organization we had to change our strategy, our focus and our skills," he adds.

The role of IT is now central to successful research and development at Aventis. "This visibility has moved the organization from the background to full partnership," Loupos says. Aventis now employs "a cross-functional team approach, bringing together the skill sets of scientists, informaticians and IS professionals to create new solutions to drug discovery."

At Merck, the 30-person bioinformatics group is one-third computer scientists, one-third natural scientists and one-third that rare breed—the bioinformatician—with a dual background in science and IT. "To do [informatics] correctly you need to blend scientific skills and IT skills. Many on our staff are scientists with strong IT backgrounds," Pfizer's Roberts says. "Otherwise you get technology without a purpose."

That partnership is particularly vital because most pharmaceutical companies are doing a combination of building some tools in-house, licensing software, and partnering with or buying up companies that already have a piece of the technology. The main reason for these acquisitions is that most can't find enough qualified individuals to keep up with their demand for new tools, and their core business remains drug, not software, development. "Our internal resources don't come close to matching our demand for tools," says Ken Fasman, vice president and global head of research and development informatics at Waltham, Mass.-based phar-

maceutical company AstraZeneca. Fasman works out of Waltham and oversees a staff of 55 worldwide.

In 1998, Bristol-Myers Squibb built its own Laboratory Information Management System (LIMS), a database that allows the company to track DNA samples as they are sequenced, stored and analyzed by scores of different scientists. The choice to build rather than buy at that time was out of necessity. "None of the vendors offered the kind of flexibility we needed," Siemers explains. He needed a system that could be easily accessed by a scientist who was working at the bench with only three samples as well as by researchers examining 30,000 samples with a high-throughput screening device.

Although that LIMS is still in use at Bristol-Myers Squibb, the preference now is to buy informatics software and integrate it into the company's custom-built systems. "Our philosophy is if we can find a tool from a vendor that will do the task, it's in our interest to just go out and buy it," Siemers says. "Our business is drug development, not software engineering."

But hundreds of vendors in the informatics space combined with varying standards and platforms makes the integration task tricky. Even Pfizer, known for doing more informatics in-house than most, works with about 15 major vendors in this area. "It's really become an integration job, and it's very difficult," Roberts says. At Pfizer, Roberts

uses simulation software from St. Louis-based Tripos, chemical databases from San Leandro, Calif.-based MDL Information Systems, and screening and visualization tools from Cambridge, Mass.-based Spotfire, just to name a few. "We work very closely with all of our partners and try to sway them to build to our standards," he says. "But frankly none of these sys-



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tems are perfect, and we have to build a lot of bridges.”

For example, Pfizer’s scientists often use one database to examine the chemical structures of compounds in order to make assessments about their viability as drug targets. And then they have to transfer that information into a completely different piece of software from another vendor to assess that molecule’s biological properties or safety. As a result, Roberts and his department are constantly faced with the challenge of building application programming interfaces (APIs) between different systems and databases.

Although vendors are beginning to offer more modular systems that can plug in to other systems or well-documented APIs in an effort to garner a bigger chunk of this billion-dollar business, many are still hawking closed, standalone systems. “We’re able to push vendors more and more to work with open standards, but when someone has a monopoly position, you don’t have a lot of leverage,” says AstraZeneca’s Fasman, who works closely with his IS counterparts to deal with such problems.

The number of mergers and acquisitions in the drug industry further complicates the integration issue. Recent major drug marriages include Warner-Lambert with Pfizer, and SmithKline Beecham with Glaxo Wellcome to produce the Middlesex, England-based GlaxoSmithKline. “Everyone has different databases,” says Dinerstein of Aventis, which was formed by the merger of Hoechst Marion Roussel with Rhone-Poulenc Rorer in 1999. “We have immense amounts of data, but our first task is to figure out how to make that data accessible.”

Culture Shock



One of the thorniest impediments to informatics is not technical integration, but cultural assimilation.

“The pharmaceutical industry is one of the most hidebound industries in the world,” says Alan Hillyard, senior vice president of cheminformatics research in the San Diego office of Lion Bioscience, which is based in Heidelberg, Germany. “They don’t

want to adapt to anything. They had one guy working in a lab in the 1900s, and that’s the way they still want to do it. They have the most sophisticated tools, and they want to be cutting edge, but there’s still that attitude of ‘We’ve always done it this way.’”

Some compare the traditional process of drug development to spending millions to build an airplane and then simply sending it off a cliff to see if it flies. But just as the aviation industry slowly began to integrate bits

was when we moved to test tubes. But in vitro didn’t replace in vivo; it added on to it. It’s the same thing with in silico drug development. It simply gives us another way to approach the problem.”

Eventually, however, there should be a symbiotic relationship between science and technology. Pfizer, which has released eight successful drugs in the past five years, hopes to double the output of its drug discovery efforts as a result of bioinformatics integra-

 **IT’S GOING TO TAKE A LOT OF WORK TO CONVINCE RESEARCHERS TO LOOK AT A GENE EXPRESSION STUDY AND TRUST WHAT THEY SEE.”**

—RICHARD BLEVINS, DIRECTOR OF BIOINFORMATICS, MERCK

and pieces of computer-aided design and modeling 30 years ago—and Boeing completely changed its development cycle to go straight from in silico design to production on its 777 aircraft in 1995—some predict a similarly dramatic change in the way pharmaceutical companies develop medicines.

Yet it won’t happen overnight. In 20 years perhaps, the pharmaceutical industry may be able to develop a drug that relies heavily on genomics, high-throughput screening and computer-aided drug design, but the integration of informatics will require a complete change in the culture of the pharmaceutical industry. “It’s going to take a lot of experimental work to convince the researchers to look at, say, a gene expression study and trust what they’re seeing,” explains Blevins, who hopes to eventually use gene expression studies to screen Merck’s entire compound collection.

Leaders in the emerging field stress they will never be able to fully develop a drug using only computers, as some analysts have suggested. “That’s nonsense,” Fasman of AstraZeneca says. “The reality is that scientific experimentation started out in vivo, in real animals and plants. The big advance

tion. But thus far company officials say there have been no measurable returns.

The significant time and costs savings may not come until these companies have an end-to-end, IT-driven research and development solution. Analysts and executives agree that it will be another three or four years before this technology starts to have an effect on drugs already in the clinics and 10 to 12 years before there’s a real effect on the entire drug discovery process. “So far, informatics spending has been piecemeal, in pockets where the company does understand the impact of the technology,” says Vikas Taneja, a project leader at Boston Consulting Group.

But they are optimistic about its potential. “We’re already looking to a new future where there is constant give-and-take between what is learned at the bench and what we do at the computer to allow us to conduct more effective experiments faster,” Fasman says. “There’s quite a bit of hope.” **CIO**

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Make Way for Web Services

They're inevitable. Just ask the big guys. BY ERIC KNORR

WITH REMARKABLE frequency, people who tout Web services as The Next Big Thing always begin by trashing wireless. Wireless requires massive investment in infrastructure; Web services use current infrastructure. Wireless offers expensive solutions to problems that never existed; Web services offer cost-effective

solutions to everyday IT problems.

The message is that the Web services concept stands apart in its common sense. It's a simple idea: Enterprise applications should be broken down into reusable components called services, each one performing a distinct task. These services can then link together across or within enterprises using

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the only data exchange standard everyone can agree on, XML. Like a kid stacking toy blocks, you can build applications from Web services very quickly, borrowing blocks from others when you need them.

Drawing on systems as disparate as a Hitachi mainframe and an NT server, for example, insurance company execs could click and drag Web services to create one-off packages. Car rental and airline reservation systems could integrate across the Internet with minimal development effort. Once you break applications into Web services, low IT overhead makes such experimentation practical—or so the theory goes.

"We've been talking about modular and object-oriented software for years, and in many ways this is nothing more than the realization of that," says Frank Moss, chairman and cofounder of Bowstreet, an enter-

prise portal provider that is building its business on Web services. "It's finally happening due to the emergence of XML as the standard for interoperability. All computing is going to become Web services."

A statement like that would stretch credibility but for the all-star cast supporting it, including HP, IBM, Microsoft, Oracle and Sun. Predictably, each vendor has a self-interested spin on Web services. And the Web services world has already split in two, with Microsoft's .Net promoting services that run only on Windows while the J2EE (Java 2 Enterprise Edition) crowd pushes its own platform-agnostic, Java-specific solution.

Yet the chorus of heartfelt endorsements can't be ignored. IBM has even deployed its own Web services evangelist, Steve Holbrook, who cheerfully asserts to anyone who will listen that Web services "is

going to happen more rapidly than we've seen integration efforts happen before."

Weaving the Services Web

Holbrook's optimism stems in part from the accord on key Web services standards by industry heavyweights who normally agree on very little. Such harmony is essential, because XML by itself merely describes a broad framework. Three, more narrow standards—Simple Object Access Protocol (SOAP); Web Services Description Language (WSDL); and Universal Description, Discovery and Integration (UDDI)—enable Web services to talk to one another. (See "Web Services Standards," this page.)

Created by Microsoft, IBM and others, both the SOAP and WSDL standards are in their 1.1 versions and have been submitted to the W3C standards group. Although in its second version, the UDDI spec won't reach standards organizations until mid-2002. And a host of other proposed specs for secure transactions, digital signatures and encryption could be bouncing around committees for some time.

Service Without the Smile

When will Web services take off and what, if anything, should you do about them now? Here the happy face of industry agreement cracks. The answer you get depends on which vested interest you ask—and those companies that are further along, such as Microsoft and IBM, will tell you to take action sooner.

"I think Microsoft is way ahead in Web services—over Sun, in particular," says Gartner Analyst David Smith. "They have seen the future, and it is Web services—and they have pointed the company in that direction. Sun has not done that. Sun was in denial, and they are starting to realize they'd better do something or lose the leadership that they have had."

However, even Microsoft acknowledges that enterprises won't start building .Net Web services en masse until next year or

Web Services Standards

Some key terms to know when looking at Web services

Simple Object Access Protocol (SOAP)

Developed by Microsoft, IBM and others—and submitted to the W3C as an open standard—SOAP outlines how the envelope for XML messages should be written and how the messages themselves should be encoded.

Web Services Description Language (WSDL)

Developers use this to expose what a Web service can do. When a client or another Web service makes contact with a Web service, the initial response comes in the form of a WSDL message.

Universal Description, Discovery and Integration (UDDI)

Think of UDDI as a directory for Web services. It has three parts: a White Pages that lists contact information about the company that developed the Web service; a Yellow Pages that lists Web services by such categories as geography and industry code; and a Green Pages that includes WSDL descriptions, e-business rules and how to invoke the service. The idea is that eventually, every public Web service will be registered in a grand UDDI directory, so Web services can dynamically discover each other, hook up and integrate without human intervention.

E-Business eXtensible Markup Language (ebXML)

Jointly sponsored by a UN standards agency and Oasis, a nonprofit consortium, ebXML purports to create a complete framework for XML-based B2B e-commerce, particularly those involving secure transactions. Industry players disagree whether the adoption of ebXML is necessary, or whether existing Web security protocols will suffice.

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the year after. Meanwhile, Microsoft's Charles Fitzgerald, director for .Net platform strategies, suggests that enterprises "pick a pilot project and start to work with XML Web services." He cites Dollar Rent-a-Car's SOAP-based integration with Southwest Airlines as an early, shining example.

Sun Microsystems Chief Technologist of iPlanet Products Hal Jespersen takes a more conservative view. "I think that the infrastructure that's available today is not suitable for real-world business applications yet," he says. "Some of the standards are in the category of emerging. I'll give you an example: SAML [Secure Assertion Markup Language], the security standard that passes security credentials from one enterprise to another. That's in the standards committee, and I would expect that to be done by the end of the year, probably."

Even the tools to create Web services stir controversy, perhaps because it's here that Microsoft's lead seems most obvious. The Visual Studio.Net development environment, due to ship by year-end, includes XML- and SOAP-enabled versions of Visual Basic, C++ and C#—C Sharp, Microsoft's new Java-like programming language

COM+ component and turn it into a Web service." By contrast, he says, "Every Bean application that's developed in Java is already enabled for Web services in the model that BEA is supporting." For now, that model means you must run the latest SOAP-enabled version of BEA's WebLogic application server.

As Sun's Jespersen notes, the mechanics of building Web services matter far less than sound architectural planning. Asked what IT execs should do now, Jespersen offers this insight: "I would have the architects in my organization take a look at what applications I have today and see how to decompose those applications into Web services," he says. "I believe the heavy lifting associated with designing a good Web services infrastructure is to do that analysis—it's not to wrap SOAP around it."

Getting Ready

Some lifting, heavy or otherwise, will be required to transform even the most component-oriented IT shop to a Web services architecture. Architects will have to think hard. Developers will need to be reeducated. And many IT managers will balk at

Even the tools to create Web services stir controversy.

for .Net development. The Java community likes to slam the forthcoming suite as incurring a steep learning curve for current Visual Basic programmers, and has nothing but scorn for Microsoft's Java killer, C#.

Scott Dietzen, CTO of BEA Systems' E-Commerce Server Division, makes a stronger point when he compares the amount of effort that will be required to convert Enterprise Java Beans to Web services versus rewriting Microsoft distributed components: "The expectation is that a 30 percent to 60 percent rewrite will be required if you're going to take an existing Visual Basic application and turn it into a .Net application or take an existing

the idea of relying on distributed components of uncertain quality over Internet connections that although increasingly dependable, can't match the availability, performance or security of in-house systems.

Again, the unanimity among industry giants in answering such objections is striking. Almost everyone sees Web services as inevitable; the disagreement is in the timing. Few argue with the strategic advantage: the ability to rearrange Web services dynamically into custom applications that map closely to business processes or customer needs—without breaking IT's back. Although the big players so far have focused on Web services development, sev-

Companies to Watch

Peribit

GENE RESEARCH may seem like a long leap from network performance management, but startup system vendor Peribit has made the connection.

Using technology originally developed to help find patterns in near infinite strings of DNA data, the Santa Clara, Calif.-based company has produced a network compression product that can identify repetitions in network data streams on-the-fly. The system then catalogs these repetitions, letting the network send tiny representations of the data instead of the entire stream.

The system is similar to other data compression technologies that have existed for years in such archiving standards as .ZIP. Where Peribit's Molecular Sequence Reduction (MSR) technology differs is in its speed. The company's first product, the SR-50 (starting price \$20,000 each—two are required, at minimum) can monitor as much as 45Mbps of data traffic, searching for patterns of any length, from bytes to megabytes.

Peribit claims IP traffic reduction of as much as 90 percent, depending on the type of data traveling over the network. The company also says that most installations take less than 10 minutes. For more information, visit www.peribit.com or call 408 328-6000.

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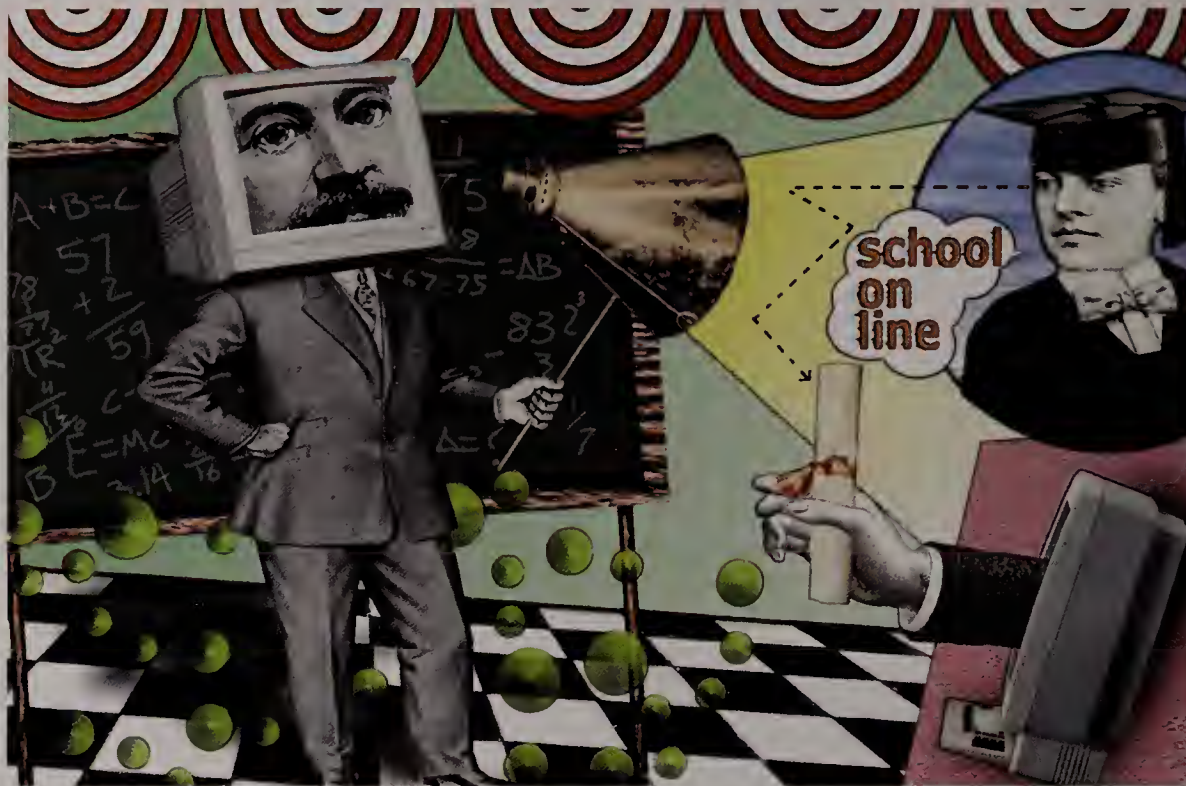
eral smaller companies—including Asera, Avinon and Bowstreet—are producing graphical tools that the business side can use independent of IT to build working applications from Web services components.

Like Bowstreet, Asera was delivering Web-services-like solutions years before the phrase was hot. Asera's eBusiness Operating System lets developers create Java-based "logical building blocks" using functionality offered by monolithic software from Ariba, i2, PeopleSoft, SAP, Siebel and others. Nonprogrammers then employ the Asera Development Workbench to reshuffle those services to their heart's content. Avinon's solution, the NetScenario Studio graphical environment and the NetScenario Business Server, today provides an arena for manipulating .Net Web services—and if everything goes as planned, J2EE Web services by early next year.

Where will Web services see their first practical applications? Microsoft's Fitzgerald suggests that business processes with the most points of integration with other systems, such as CRM, will benefit most. Gartner's Smith believes the killer Web services app for B2B will be the private exchange, where trusted trading partners integrate via XML without relying on the still evolving UDDI directory. And Bowstreet's Moss sees the ability to mass customize portals for customers and internal operations as the main market driver.

Each enterprise will develop its own priorities based on its own pain points and opportunities. "Companies are transitioning from being product providers to becoming service providers," Moss says. "To grow their revenue, enterprises have to provide more and more services around their products or existing services. The Web services architecture is a natural way to do that. If you were to try and provide those services using programmers to build applications every time you wanted to bring a new service to market, you'd never make it." ■

Eric Knorr is a freelance writer and consultant in San Francisco.



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THE TYPICAL online college makes Brigham Young University look like a party school—no frats, football games, concerts or beer blasts. And that's just the problem, says John Seely Brown, coauthor of *The Social Life of Information* (Harvard Business School Press, 2000).

By focusing solely on academic issues, online universities fail to give their students the social context that allows information to become meaningful, claims Brown, Xerox's innovation officer and former director of Xerox PARC in Palo Alto, Calif. "Take away the social context and what you have is essentially a person with a computer and no education," he says.

Brown maintains that students transform the information they get from instructors and texts into meaningful knowledge through conversations, arguments, lunches, discussion groups and other real-world activities. "Bull sessions actually do have a lot of value," he says.

Colleges, businesses and other organizations that offer Internet classes are gradually beginning to recognize the need for social interaction. Many have already added social surrogates to their online instruction. E-mail, instant messaging, chat rooms and threaded discussion boards can help bring students and instructors closer together, says John Flores, executive director of the United States Distance Learning Association in Needham, Mass. "These tools allow a sense of intimacy to develop," he says. "You don't feel like you're just reading a book on a screen."

Flores admits that an online school will never be able to offer the same degree of social interaction as an ivy-covered, brick-and-mortar institution. Still, he believes that streaming media, videoconferencing and other multimedia technologies will eventually help make online instruction almost like being there. "For people who don't have the time or resources to attend a real-world school, online instruction that incorporates socializing technologies is the next best thing," he says.

—John Edwards



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REVISIT

Speech recognition

Look Who's Talking

After a decade of deafness, speech interfaces finally are ready to listen BY FRED HAPGOOD

IN THE EARLY '90S we stuck a fork, editorially speaking, in speech recognition and declared it done. In three articles on the technology (February 1991, April 15, 1992 and Nov. 1, 1993), each more enthusiastic than the last, we said that speech recognition was about to hit the market—and the market was going to notice when it did.

The reason for our excitement was that the technical problems that had bottled the technology up in labs for decades were finally being addressed. The most basic issue had been associating specific vocalizations with specific phonemes. (Phonemes are the basic units of speech. For example, the *wuh* sound in *one*.) Making the associations required compiling huge databases of how the more than 40 English-language phonemes are spoken by those of different ages, sexes, linguistic cultures and under different phone-line conditions. Developers then had to write programs that could find the

degree of fit between a given user's vocalization and one of those samples.

Once software recognizes a phoneme, the sound has to be assigned to a meaning (unless the product in question is a simple dictation engine for directly recording and transcribing speech). That meant building more databases, and this time of all the ways humans might express meanings of interest, such as *yes, sure, right, correct, yep, yup, yeah, uh-huh, fine, OK, affirmative, good* and so on. Since the culture was throwing off new expressions constantly—*whatever, no doubt, word*—the programs also needed to be easy to update in the field. Then grammar algorithms needed to be written and hardware developed that was fast enough to do all that computation in real-time, yet cheap enough for ordinary businesses to buy.

By the early '90s all those pieces were falling into place or were close to doing so,



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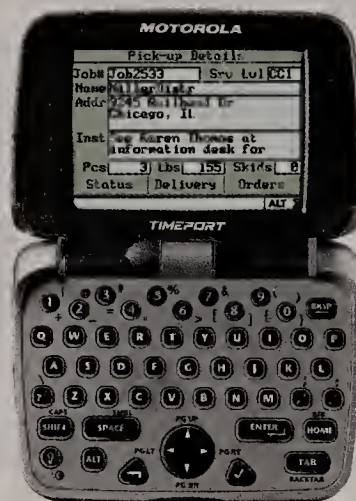
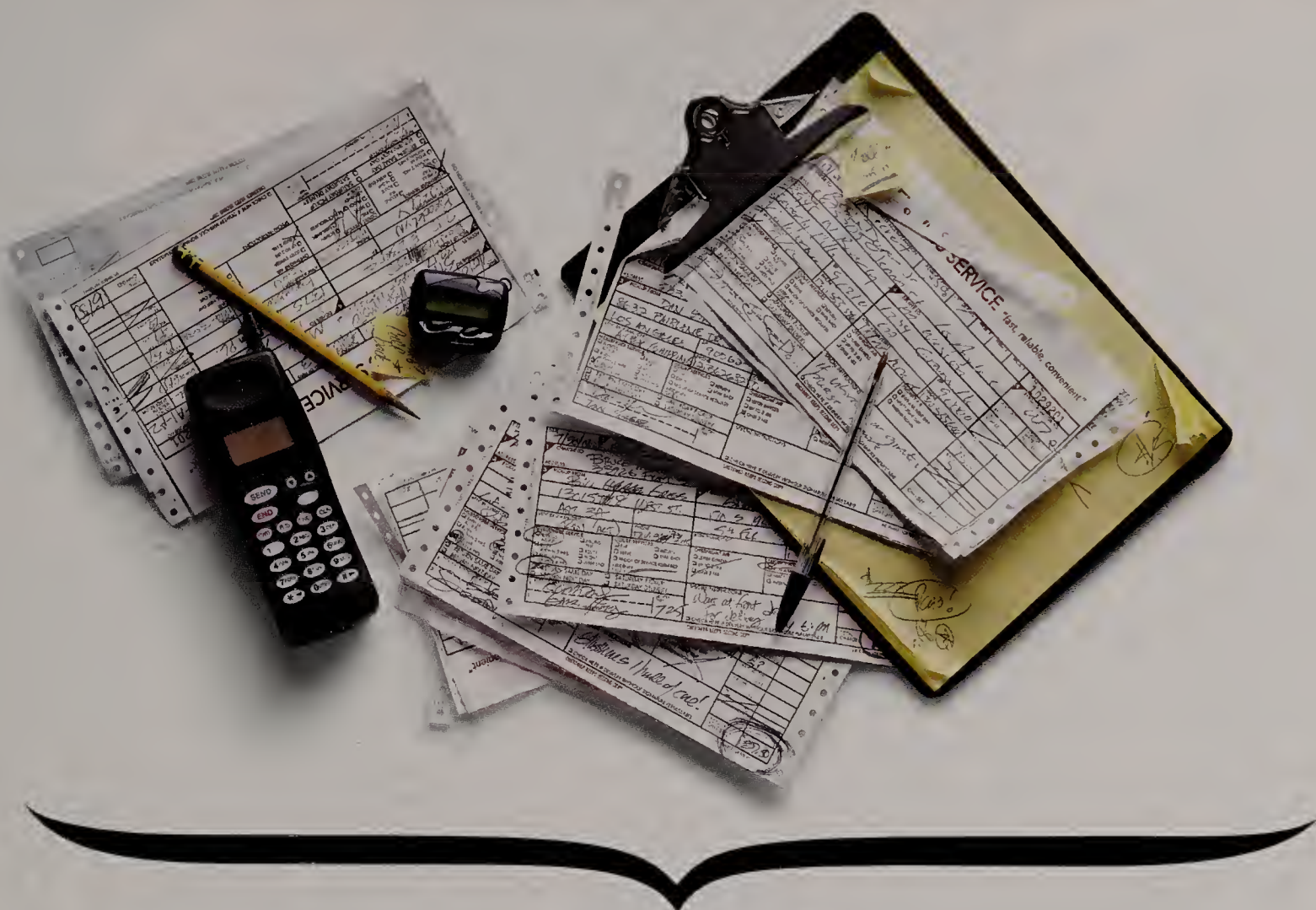
Despite a continuing slowdown in the general economy, spending on information technology services remains strong, according to a recent report from Framingham, Mass.-based analyst company IDC (a sister company to *CIO*'s publisher).

The report, titled "Worldwide IT Services Industry Forecast and Analysis: 2000-2005," claims that the IT services market grew 11 percent in 2000 to \$395 billion. By 2005, the report predicts, spending on IT services will increase to \$700 billion. The report notes that the recent significant troubles in the U.S. economy will not prevent the United States from continuing to be the biggest purchaser of IT services. However, the Asian-Pacific market (excluding Japan) will be the fastest growing market, rising at a compound annual growth rate of nearly 23 percent.

According to IDC, the strongest growth areas in the IT services market through 2005 will be application outsourcing, network consulting and integration, and network infrastructure management, with systems integration accounting for the largest portion (\$142 billion) in 2005.

For more information about the report, visit www.idc.com.

—Christopher Lindquist



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and we felt the implications were significant. A wide range of enterprise functions, from order entry to customer support to incident and inspection reporting, were about to get cheaper and easier to perform. Computation and telephony were going to merge. We were all going to get out of voice mail jail. "A decade from now perhaps

with people; even more so, since most users were and are uncertain about how to talk to software. "Suppose you said you wanted to go to Boston and you heard the reply, 'I don't understand,'" says William Meisel, president of TMA Associates, a speech recognition consultancy in Tarzana, Calif. "This was a common response at the time.

It turned out that speech recognition is only partly a technical problem.

speech recognition will be as ubiquitous as voice-messaging is today," we concluded.

While considerable progress has been made since then, we are not there yet. Were we wrong in our judgment of what had been achieved technically? Probably not. As a volunteer subject in a university speech recognition project, I can testify firsthand that the technology was indeed about where we claimed.

It turned out, however, that speech recognition is only partly a technical problem. Recognition implies a conversation, and conversations make sense only in the context of relationships. When humans enter relationships they immediately impose a structure of assumptions and expectations. Is the person smart? Knowledgeable? Nice? Lazy? Snobbish? That structure controls the interaction. If a comprehension problem comes up during a conversation with a smart person we assume we are at fault and take on the responsibility of working it out. We do the same if we think our respondent is not too bright but basically nice. On the other hand, if we think the other party is lazy, doesn't care or worse, is trying to manipulate us, we behave very differently.

Those relationship issues are just as important when talking with machines as

But what didn't [the computer] understand? Was it your pronunciation? Usage? The logical thread? You didn't know."

What you did know was that the program refused to give help when you needed it. This refusal became a cue in and of itself—a sign that the machine planned to shift all the work of the conversation onto the user. Humans reacted to that the same way they would have in a conversation, with resentment and irritation. They raised their voices and sounded out words as if they were speaking to a child. Their voice became stressed. They changed their pitch. They started to swear. This would confuse the program even more, until eventually users hung up with a bang.

Today the industry understands the importance of giving the user as much help as possible, Meisel concludes, which might mean building another database—this time of the most common errors—and writing prompts that suggest specific solutions to problems. For example, the computer could ask, "Do you want Austin or Boston?" This does more than locate the problem as a pronunciation issue; it reassures the user that the program has the smarts to understand the situation and is willing to help the speaker solve it, which in turn makes users more disposed to working with the program.

Mike Phillips, CTO of SpeechWorks International, a speech recognition product and services vendor in Boston, offers many other examples. Answering a ques-

tion with "unauthorized request" might work on a webpage, for instance, but in the context of speech it communicates a haughty indifference. A better answer would be, "I'm sorry, my supervisor doesn't allow me to make that transaction" in a sympathetic, you-and-me-against-the-world tone of voice. The old way of saying that a database is down was simply, "That database is down." That might work as an error message onscreen, but in the context of speech a better way might be to sigh and say, "I'm sorry, the system is giving me a lot of trouble right now."

Speech recognition systems used to ask people to "Wait for the prompt to finish before speaking." That made the technology easier to implement, but it communicated a snippy insistence on privilege and hierarchy that annoyed users. Today most speech recognition software is "barge-in enabled," which means that speech recognition programs defer to users whenever they interrupt. "The point is to keep assuring the user that the system is on her side," Meisel says.

During the past few years the underlying technology has continued to improve. (Meisel estimates that the error rate in phoneme recognition accuracy falls by about 30 percent a year.) The technology is now in the peculiar position of outrunning expectations, says Phillips. Good speech recognition is perfectly capable of handling a complete sentence, such as "I want to take the red-eye from Boston to Austin a week from Wednesday," but most users still want a highly structured interaction that prompts for each element of the transaction. Phillips's hope is that as their experience with speech recognition applications grows, users will relax and conversations will get more ambitious and wide-ranging. But whatever happens, the programs will always be very, very nice. 

Do you have a topic that you'd like us to revisit? Send it to et@cio.com.

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CIO Confidential

Only the Names Have Been Changed

A Letter to Our Suppliers

In which we ask why they are marketing
impossibilities instead of technologies

BY ANONYMOUS

DEAR VENDORS,

Like most CIOs, I'm a simple person with simple needs. Give me a house on the ocean with a view of Nicole Kidman's swimming pool and a dangerously fast car with diplomatic plates, and I'm happy. And, of course, give me the things that money can't buy, like a computer that works like the ones on TV.

Have you all watched any of your commercials on the morning cable news channels lately? You know, the ones flogging technology? What the hell are you guys thinking? Now, I freely admit that what I know about advertising and marketing could fit on the back of a matchbook. And I suppose that there might be some value in selling technology that doesn't exist yet (after



all, what's the harm in pumping a little sunshine up our collective skirts now and then). But what in the world is the point of marketing technologies that will, for technical reasons or general lack of interest, *never* exist? (Please note that when I say never exist, I mean in my lifetime—the only horizon I happen to care about.)

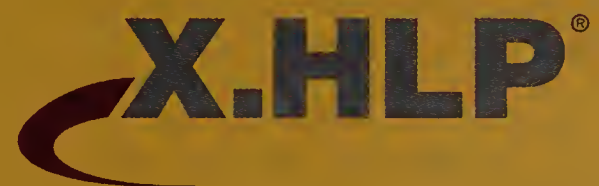
I first noticed this particular bit of silliness a few years back when Oracle began running an ad for an Internet access device—a low-cost keyboard and modem hooked to a televi-

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sion set that would bring the Internet to poor children. The ad opened in an inner city apartment building and zoomed through a window where we saw a kid, keyboard on lap, accessing an educational website. On the television in front of him a whale breached and fell back in the water in colorful, full screen, flawlessly fluid motion. What Oracle failed to explain in the ad, besides where one could go to buy one of these things, was how this kid's family was able to afford a T1 circuit and the associated hardware to support 30 frames per second full-motion video. This, we were left to assume, must be the best wired tenement building in New York City.

My current favorites are a couple from my friends at IBM, part of their "E-Business Innovation Campaign" series. In one, a woman points her cell phone at a soda machine, hits a button, and a can of mildly corrosive, carbonated sugar water rolls out to the tag line "Wireless E-Business Coming from IBM."

Hey, I'll go out on a limb here and predict that this is *not* the future of e-business—not because it can't be done, but because it won't be done (and while you guys will never admit it, I think you know that). This happens to be an area I know something

What Oracle failed to explain was how this kid's family could afford a T1 circuit and the associated hardware to support 30 frames per second full-motion video.

about, so believe me when I tell you that an outdoor, graffiti-covered pop machine being serviced by a minimum wage delivery person, appropriately outfitted and networked (wireless or otherwise) to accept payment from a cell phone would make the cost of a can of Pepsi about, oh, five bucks.

Might as well vend Dom Perignon in Waterford crystal glasses.

But pop machine profitability aside, and acknowledging the crushing burden of carrying around more than a couple of quarters in your pocket, how is a cell phone easier, more reliable or more secure than a credit card?

The other e-business ad, to be forever filed under the heading Fat Chance, opens on an aggravated businessman speaking rapidly into a speaker phone in one of those languages that seem to have no breaks between words. Let's say it's Turkish. Taking the heat at the other end of the line is a young woman in Anywhere, USA, except she's hearing the words translated by a computer, real-time, in English. Her answers, spoken in English and translated real-time back into Turkish, are heard on the conference room speaker in the same high octave female voice. The businessman's concerns are addressed, and everyone smiles.

What next? American Airlines advertising scheduled service to Jupiter?

Given the current state of speech recognition technology, I imagine the conversation actually went something like:

Businessman (in Turkish) *"I need to speak to someone in the service department right away!"*

Translation *"My voice will ask you to wax my dog."*

Young Woman (in English) *"Wax your dog?! What's that supposed to mean? Hey, who is this?"*

Translation *"Of course, sir. I'll connect you."*

Speech recognition is one of those technologies that's been going absolutely nowhere for a long time. Due ewe no watt eye mean? In 1984, I worked on a project with a company called Heuristics to adapt its speech recognition input device (a microphone and black box about the size of a suitcase) to a mini-computer built by MAI Basic Four. The system had a vocabulary of a few hundred words, worked correctly about 70 percent of the time and was clumsy to use. That is, it worked every bit as well as the systems we have today. The lack of real progress

during the past 17 years isn't for want of trying; it's because it's so darn hard to do. So hard, in fact, that a viable solution simply won't be developed with any of the tools we have today. Layer on top of that

the need for a consistently reliable translation processor capable of understanding accents and intonations, and then accurately communicating intent, and you're staring at a problem so big it actually stares back.

What Are You Thinking?

Given this particular trend in marketing, I recently did one of my highly informal surveys of friends to test their impression of the state of computer technology and—Jeez!—either your ads are more effective than I thought or I need to get smarter friends. There's a lot of confusion out there, and a real gap between perception and reality that may, in fact, be contributing to some of the difficulties we IT guys have managing user expectations.

So here's my question. Why? With the cost of producing and airing commercials so astronomically high, and with so many real products and real services in your offerings, what's the point of selling flashy impossibilities? Or is that indeed the point? It strikes me that these ads are (in spite of their cost) a relatively cheap way to get a foot in the door. The kind of trick that gets used car salesmen in trouble with consumer protection agencies. It seems that you are intentionally target-



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ing a nontechnical audience—executives that should, but don't, know better. Executives who write me little Post-it notes that read, Why aren't we doing this?

Honestly, guys, this is really pointless and in the long run actually hurts both our chances of delivering real value. I have a few suggestions, but first let's make sure that we're clear on three very important things: I make the buying decisions, I place the orders, and ultimately I judge the success or failure of your product. With that in mind, please consider the following suggestions when developing your next television marketing campaign.

First, speak directly and intelligently to me, the CIO, instead of to those above and around me on the organization chart. Second, stop trying to sell consulting services by intimating, however subtly, that my IT department is not up to the job ("Keane—We Get IT Done"). Suggesting that my department

is not up to the job is pure nonsense. I've seen your people in action, and they're not better than mine. Third, how about presenting CIOs in

your advertisements as competent, dignified professionals, worthy of a spot on the senior team, instead of the harried, disheveled nincompoops that have now become the television stereotype? And finally, and surely most important, market only those things that you (and we) can actually deliver.

It ought to go without saying that if you directed your highly developed marketing skills toward making my job easier, you'd actually sell more stuff. Help me sell adequate levels of investment in technology to top management. Help me direct attention to the right technologies at the right time. Help me promote confidence in my department among top management and users, and they, in turn, will green-light more projects. More projects, more spending, more orders to you, our vendors. Simple, eh? Now do it!

We'll be watching.

Sincerely, Anonymous **CIO**

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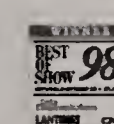
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Opinion

Re:

Marrying content and technology
The changing role of the systems administrator

Content Is Still King

BY ANTHEA C. STRATIGOS

THERE'S A FAMOUS DRAWING by Cartoonist W.E. Hill that when looked at one way features an old lady, but looked at another way, shows a picture of a young woman. This drawing mirrors the current world of technology and content; IT professionals and CIOs look at the picture from one perspective, and content managers see it quite differently.

In this day and age, separating content from technology is irrelevant. According to most of our end user research and feedback about portals and websites featuring both internal and external content, it's clear that most sites are akin to a confusing drawing where the old lady and the young lady often look like one indecipherable, hard-to-use mess. It will take the two worlds of content and technology coming together to make the picture meaningful for the end user.

For years, IT professionals and information professionals or content managers—what I call information content or IC professionals—have been operating on parallel paths. Now their worlds are colliding fast. Computer networks and the Web are cornerstones of our modern workplace. Content is the star attraction on these systems, but who's paying attention?



In dealing with all the issues and complications of building the fastest networks, the zippiest websites or the most efficient supply chains, it's easy to miss the forest for the trees—or, as is more often the case, the content for the technology. While we live in a world where technology rules, we must not forget that technology is really the enabler that makes content relevant for real people doing real things and making real decisions. Yet content is often the stepchild (dare I say it?—the old lady) in the picture.

Best of Both Worlds

So how do we make corporate portal investments meaningful, e-commerce sites useful, or the terabytes of internally generated content and tacit knowledge available to users? By bringing the best skills from both IT and IC to the development of every application. To do this, however, IT needs to talk more with

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IC, recognizing that content professionals have been around for years, and they know more about content management, acquisition, filtering, taxonomy development and categorization than any tool or technology. These information professionals—also known as librarians—already know the answers to many of the content questions posed by the IT side of the house. They know where to get content and how to present it in a meaningful way. IT doesn't have to reinvent the IC wheel.

Real content management exists as a separate competency that is often unrecognized by IT managers. It is the distinct specialty that includes knowledge and experience in a number of areas. Among the most prevalent: assessing user content needs and preferences; evaluating and selecting content from the myriad sources that best match those needs and preferences; negotiating pricing and licensing terms that are favorable to the

organization; facilitating the receipt, organization, presentation and deployment of content and making sure it's integrated with internally generated content; and managing content and Web training, including help desk services for end users.

Some CIOs already have the right idea. They know technology and content are inextricably tied together. Users will be equally dissatisfied if either the technology or the content they rely on is inadequate, but they will not differentiate between the two. Rather, in their eyes, it is one unified function that as a whole is useful or not. With that in mind, it's time for the IT and IC professionals who see the old lady-young lady drawing differently to take their views and make them one. **CIO**

Anthea C. Stratigos is cofounder and president of Outsell, a content research and analysis company based in Burlingame, Calif.

Net Effects

BY SCOTT MCNEALY

THESE ARE THE BEST OF TIMES and the worst of times for the systems administrator. On one hand, industry's increased reliance on networking has turned the systems admin into your company's Tom Cruise of technology. Even in these cooling economic times, his employment options are more encouraging than most. And yet, these are the worst of times for the systems admin. The same technological explosion that transformed the systems admin into a geek god now threatens to make his job a living hell of unmatched complexity.

The driving force behind that change is something called The Net Effect, which says growing networking bandwidth will continue to eclipse improvements in chip performance and thus drive a new wave of innovation. In today's labs, a single fiber in an optical network can handle enough information to simultaneously stream 400,000 DVDs. When you consider that the largest cable today contains nearly 900 of those fibers, you can see how a previously unfathomable amount of information will pulse through the Internet.

For a glimpse of what's to come, consider that each year the planet produces an amount of information comparable to a stack of 40 billion magazines. That includes information that hasn't yet reached the Internet, such as 80 billion photographs and 2.5 billion CDs. Can you imagine anyone trying to handle all that with a system that can't scale nor do the heavy lifting?

The problem is that massive volume equals massive head-

aches for data-center folks. Managing petabytes of data can smother the most seasoned staffs and send expenses skyrocketing. For instance, the cost of buying a storage system, which is just one element of a data center, constitutes only 30 percent of its total cost of ownership. Managing the system inhales the other 70 percent. Mounting complexity and costs will do more than drive IT folks wacko. It will ultimately bring Internet computing one step closer to the utility model in which companies will outsource their data-center operations.

In the long run, we'll see packs of systems admins leaving their employers and migrating to service providers who do nothing but data-center management. Expect some of these service providers to outsource portions of their Internet operations to other specialists. But they will need help. Those service providers will need sophisticated but easy-to-use systems that automatically manage their operations—conducting diagnostics, managing volume loads, tracking resources and balancing capacity levels. They need what I call a big, freaking Web-tone switch, which is an integrated system that is as reliable as the dial-tone system.

In the end, expect all of that to give everyone more time to focus on his true core competencies. And contrary to what some may think, the core competency of the systems admin will be to manage the service, not the server. Until then, be kind to your systems admins. They have a lot of work to do. **CIO**

Scott McNealy is chairman and CEO of Sun Microsystems in Mountain View, Calif.

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Buy Now or Pay Later



Gary J. Beach

CIOs RUNNING MAC, Unix or Linux client operating systems can skip this column. If you have Windows, read on.

Many corporations upgraded desktop and notebook infrastructures in anticipation of Y2K. Nothing new there. But such upgrades mean many of your users still boot up in pre-Windows 2000 OSs.

According to IDC (a sister company to CIO's publisher), the worldwide installed client operating system environment breaks down as follows: 20.4 percent run Windows 95, 36.4 percent have Windows 98, 12 percent opt for Windows NT Workstation, 12.3 percent go with Windows Millennium Edition, and 9.6 percent have upgraded to Windows 2000 Professional. Here's why those numbers are important.

Microsoft offers three levels of support explained in more detail at www.microsoft.com/windows/lifecycle.asp. In the so-called Mainstream Phase, Microsoft offers such things as incident support, hot fix support and online support information for up to three years after general availability of the operating

system. In year four, support morphs into the Extended Phase—basically the same as Mainstream except Microsoft now charges for it. Finally in year five, all Microsoft OSs are relegated to the Non-Supported Phase where self-guided online support is your only option.

On Dec. 31, 2001, Windows 95 officially becomes a non-supported operating system. Six months later on June 30, 2002, all Windows Millennium Edition and Windows NT Workstation operating systems enter the pay-for-support Extended Phase. Bottom line: Within the next nine months, 44.7 percent of the current Windows environments will offer fewer support options.

If you are a Windows user—and are planning to remain one—upgrade your desktop and mobile infrastructure preloaded with the Windows 2000 operating system. And do it now.

Computer prices cannot go much lower, and you can begin to take advantage of new e-business software applications optimized for the Windows 2000 platform. Why wait?



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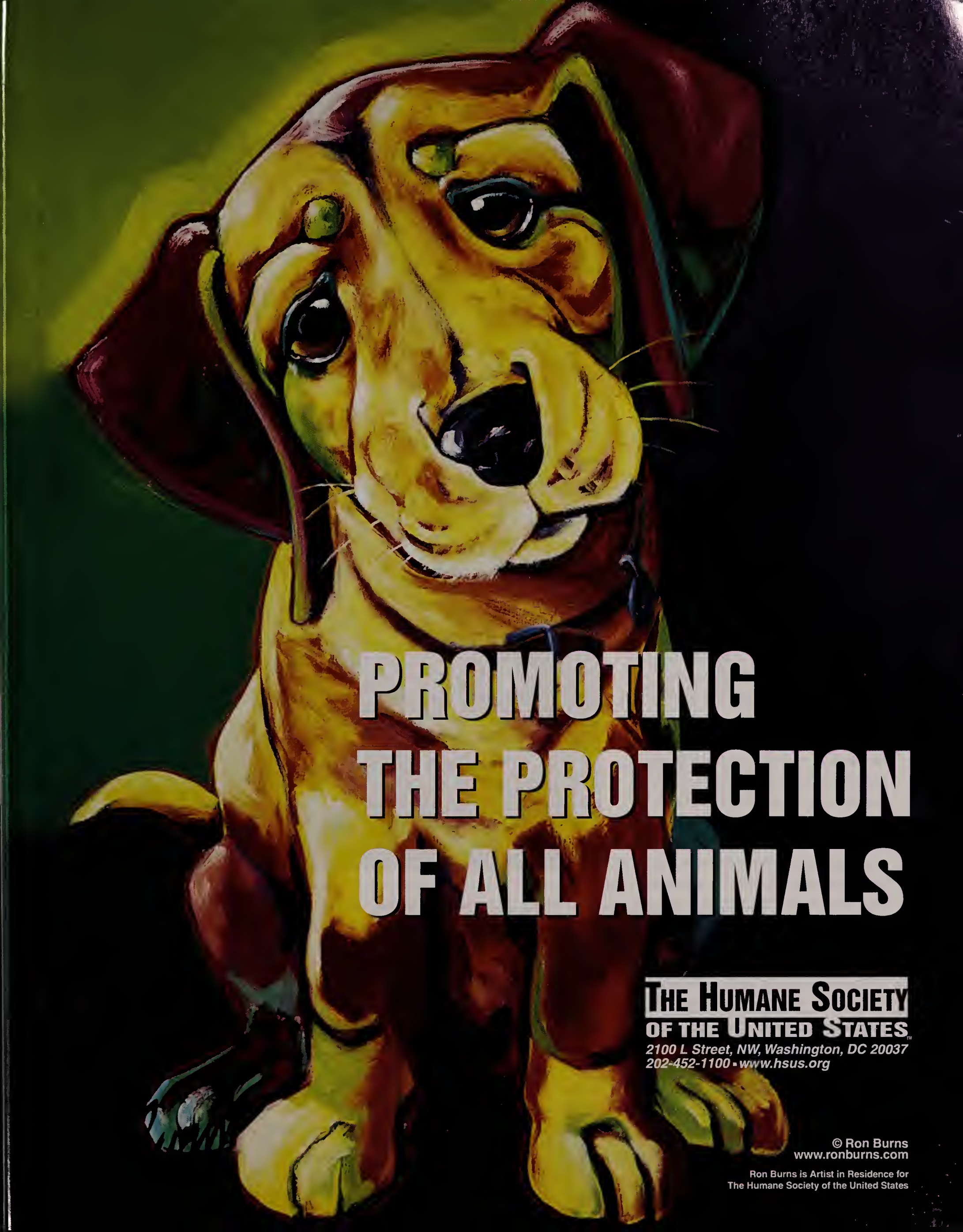
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Tools that Ruled

Word on a wire

IN 1844, Samuel Morse got a \$30,000 grant from Congress to build an electric telegraph line. Morse and Alfred Lewis Vail devised a system that sent short and long electrical impulses over a cable. At the receiving end, a pencil connected to an electromagnet made dashes or dots representing letters on a moving roll of paper. Morse sent the first message, from Washington, D.C., to Baltimore. It stated: **WHAT HATH GOD WROUGHT.**

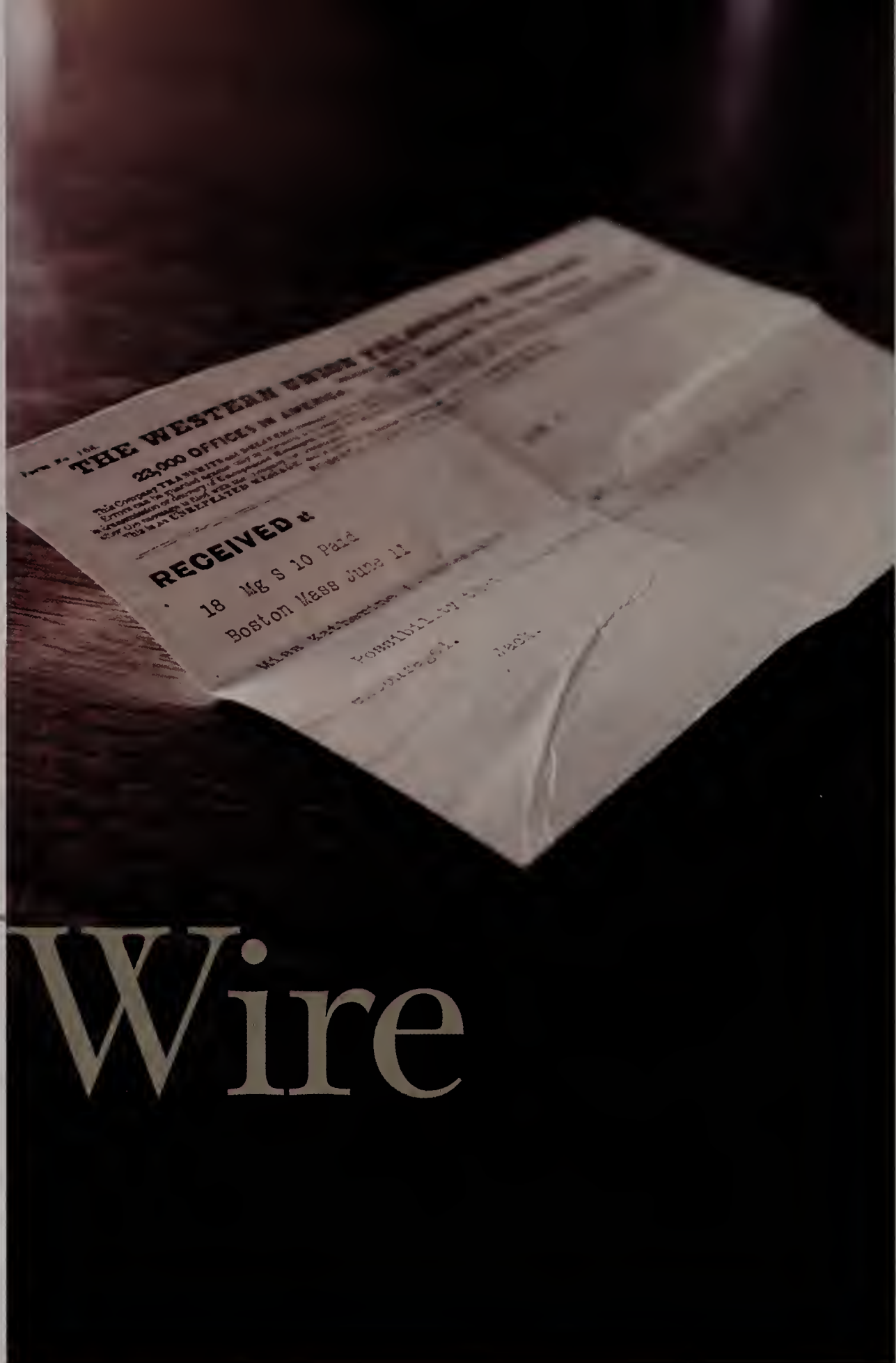
Until the telephone started to replace its succinct, pay-by-the-word poetry, all the most important news—births and deaths, military orders and train schedules—arrived by telegram. Any citizen could walk into a Western Union office and relay a message, which would be sent over the wires in Morse Code, then translated back

into writing and hand-delivered its last mile by a boy in an important suit.

Telegrams have all but vanished, although the tradition-bound U.S. Department of State still uses them for official correspondence. And Western Union offers telegrams over the Internet (*www.westernunion.com*). For \$9.95, a Web-enabled antiquarian types a 1,000-character message into a Web browser. By the next day, Western Union prints and delivers the message anywhere in the United States.

Upon arrival, though, the telegram doesn't have nearly the status it once did. I sent one to my husband, who works at the Metropolitan Museum of Art, aficionado of all things old. The message sat in the mailroom over the weekend before getting to his department. "A telegram came for you," said the sleepy secretary the next time he passed through. **CIO**

Senior Writer Sarah D. Scalet (sscalet@cio.com)
has yet to receive a telegram.





If you ask IBM, e-business is complicated and hard. So don't ask them.

With fourteen operating systems, multiple chip architectures and a tangle of middleware to deal with, IBM's servers sure need a lot of integrating. No wonder they charge so much to "manage" customers' infrastructures.

On the other hand, Sun systems run on one chip architecture and a single operating environment, so you can scale from under-\$1,000 desktop systems to over-\$10-million data center systems without breaking a sweat (something you won't find at IBM). Because all of our systems are built with open interfaces and APIs, they integrate seamlessly with heterogeneous environments and proprietary IBM environments too. That means you can run just about any e-business solution on the planet without extra overhead. And since every Sun system is open, you can pick and choose the best-of-breed solutions that meet your very particular requirements.

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take it to the nth



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